THE GRAY SHEET

Computer Industry

REPORT

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Computer Industry REPORT

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Japan's PC Price Wars: All Quiet — So Far

Since Compaq's deep price cuts in September, U.S.-based PC suppliers Apple, Digital, and IBM have followed suit with worldwide PC price reductions. Apple Computer Japan announced its intention to cut PC prices by an additional 6% to total 28% with the release of new models. Nihon DEC responded with announced reductions of between 42% and 56% on some of its products with the introduction of new models. IBM Japan unveiled a new PS/V series of PCs that includes a low-end 486SX-based 2405-WO1 priced exactly the same as Compaq's 486SX-based model.

Sounds like a price war, right? Maybe not. Most Japanese users are interested in NEC's response to the U.S.-based challenge. And, due to production and supplier differences between NEC and other suppliers, NEC is less able to compete with U.S. suppliers on price alone. NEC might be able to compete on price only if it were to drastically restructure its production and distribution systems.

Nonetheless, with 50% of the Japanese PC market, NEC had been expected to take intermediate measures such as slashing prices on existing models by 10% to 20% and announcing new low-end 486SX-based models at prices 20% to 30% higher than IBM and Compaq models. These expectations, however, were not quite on target.

NEC Calm

Shortly after IBM's price-slashing response to the Compaq salvo, NEC's Executive Director, Yoshi Takayama, coolly quelled expectations of Japan's PC giant being drawn into a price war. Takayama said that "the total market share of low-end lines is less than 20% and NEC will continue to concentrate on the remaining 80%-plus of the market in which there is much room to enhance price performance." He added flatly, "price cuts alone do not lead to greater PC use."

NEC's strategy, instead, is to focus on yet-to-be-cultivated and potentially large multimedia PC markets and to lower prices for TFT color LCD notebook PCs and LAN server models. With the announcement, NEC lowered prices on its color notebooks by a maximum of 20%, bringing prices down to ¥498,000 ($4,150), and reducing LAN server models by 56% to ¥980,000 ($8,167). According to NEC officials, price cuts for the TFT LCD models were realized by enhanced production

IN THIS ISSUE:

Worldwide PC/Workstation Market, 1992 2
Worldwide Packaged Software Market, 1992 3
FY91 Japan PC/Workstation Unit and Value Shipments by Application 3
Domestic Vendors Hit Hard By Sluggish Markets, High Yen 4
Top Japanese Electronics Companies' 1992 Pretax Profit Projections 4
Major Domestic Vendors' IT Business in Japan 5
Fujitsu Profile 6
NEC Profile 6
Hitachi Profile 6
Worldwide IT Market, 1992 6
IBM Japan Profile 7
Toshiba Profile 7
Mitsubishi Profile 7
Three Key Issues in Today's IT Markets in Japan 8

Much of the information in this issue has been excerpted from the Gray Sheet's *sister publication, the IDC* Japan Report. *Published monthly in Tokyo since 1974, the* Japan Report *provides a broad analysis of industry trends unique to Japanese IT users and suppliers. Please direct inquiries to IDC.*

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yields of the color panels and brisk sales of these notebook models. For the first time, NEC also introduced high display resolution of 6401~480 on its low-end models allowing Window use.

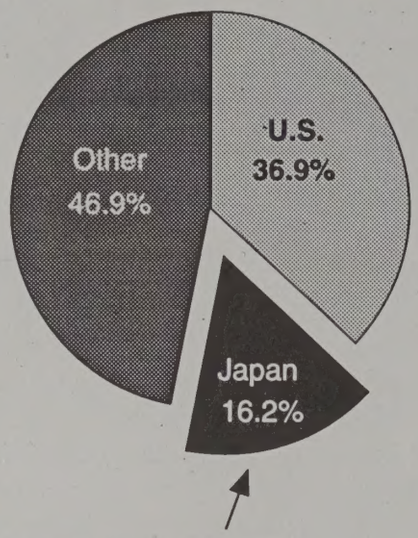
Other than the price reductions mentioned above, NEC will take a wait-and-see attitude for the next six months or so while pursuing various measures to lower production costs, including possible parts and components outsourcing in countries outside of Japan such as Taiwan.

The most immediate negative impact of the U.S.-based price reductions, oddly enough, will be on many DOS/V PC hardware and software vendors. Most members of the Open Architecture Developers Group (OADG), IBM's DOS/V PC standardization enclave in Japan, were surprised by IBM's announced pricing policy because unless they can follow IBM's lead, they may be forced to sell PCs OEMed from IBM or withdraw from the DOS/V-based PC business entirely.

Entrenched Pricing

The new prices for the U.S.-based machines range from one-third to one-half that of comparable Japanese-based suppliers' models. The expected return volley of price slashing by domestic vendors has, to date, failed to materialize. Many are asking why such wide discrepancies between U.S. and Japanese PC vendor prices remain. The answers to this question are two:

Worldwide PC/Workstation Revenue, 1992



Japan Revenue: $11.137B

Total Worldwide Revenue: $68.705B

Source: IDC, 1992

• The U.S. PC market is much larger than that of Japan. Nearly 90% of the U.S. market is held by IBM PC/AT and PC/AT compatibles. Those suppliers can procure parts and components that conform to the specs of this de facto industry standard from supply sources around the world. Parts and components for domestic vendor machines are sourced in Japan, making them more expensive. Because Japanese PC vendors maintain their own PC architectures, little savings would be achieved by buying parts from abroad in limited volume.

• As is the case in other Japanese industries, PC distribution channels are quite complicated, primarily because vendors try to sell products through middlemen best capable of offering personalized services to customers. The wholesaling system is multilayered with an enormous number of subdealers connected and intertwined throughout dealer networks, allowing all possible profit margins to be eked out.

NEC, like other domestic vendors, believes that U.S.-based dealers — IBM, Apple, DEC and Compaq — maintain limited distribution networks at best, and that they may not even be able to hold onto these dealers once dealer profit margins dwindle with the new lower prices. Japanese users tend to be concerned about after-sales service and available software in addition to price. Aside from its extensive nationwide sales and service capability, NEC is confident that its current PC 9800 software library (about 14,500 titles plus 300 additional multimedia applications by the end of 1992 — compared with about 2,000 for DOS/V) will protect market shares.

Many other factors such as differences in work styles and home life may also have precluded any significant U.S.-style boom in small business- and home-use PC markets. High hardware prices have also kept office workers and others who are familiar with PC operation and have wanted to own a personal com-

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puter out of the market. These users are the most likely target for DOS/V and Apple machines in these strained economic times, and stimulated sales activity is expected.

Software Skirmishes

A PC price war should spill over into Japan's ¥20 billion ($167 million) packaged PC software markets as well. These markets are dominated by a limited number of leading vendors such as Microsoft, Lotus and Just System. Distribution of their packages are handled by PC software wholesalers such as Soft Bank. The best selling packages, such as Lotus 1-2-3 and Japanese-language word processing package, Ichitaro, sell for ¥98,000 ($820) and ¥8,000 ($480), respectively. Even if the costs associated with localizing U.S.-made packages are taken into consideration, these prices are significantly higher than in the U.S.

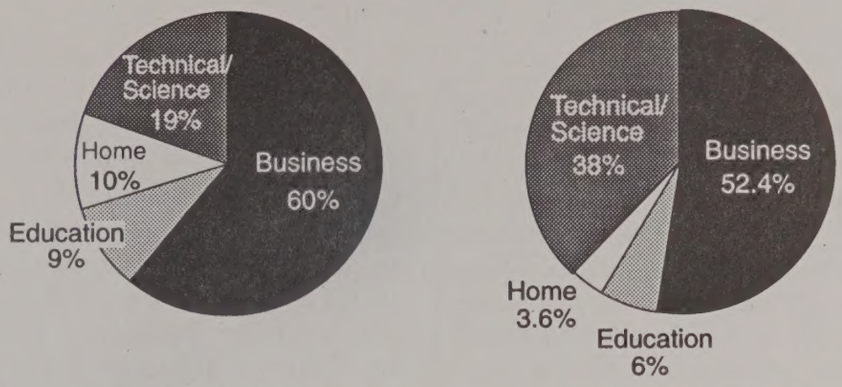
Conventional wisdom holds that the cost of software should total to about one tenth the price of hardware. When low-end hardware prices come down to less than ¥200,000, software prices should come down accordingly.

However, top executives of leading PC software vendors maintain that the problem of illegal copying makes it difficult to introduce drastic price cutting. According to Kazunobu Ukikawa, president of Just System, the company's revenues would be at least five times greater than the current ¥10 billion ($83 million) were it not for illegal copying. This argument doesn't hold up, however, when cheaper hardware prices means there are likely to be more first-time users unwilling to buy software equal to half the price of their new computer, further exacerbating the problem of illegal copying.

Recent moves by other companies indicate the price war in the PC software market has already begun. For example, recent market entrant, California-based Borland, has been waging a war of its own on installed competitor database packages by installing Borland's Paradox 3.5J package for ¥45,000 ($375), or less than half the list price, when users supply the serial number and name of rival products in use.

Through this very unusual approach, the company has sold about 10,000 copies of Paradox this year. "We are quite confident we could meet any pricing challenge launched by competitors in the Japanese market...at any time," dared Borland K.K. president, Junichi Okada. Lotus Development Japan president Saburo Kilcuchi was less confident, saying that software prices include not only the product itself but also extensive customer support costs, a key element to success in the Japanese market. However, Kikuchi was quick to add that it was about time for Japan's PC software vendors to learn from and adopt some American selling methods.

FY91 Japan PC/Workstation Unit Shipments and Shipment Value by Application Segment

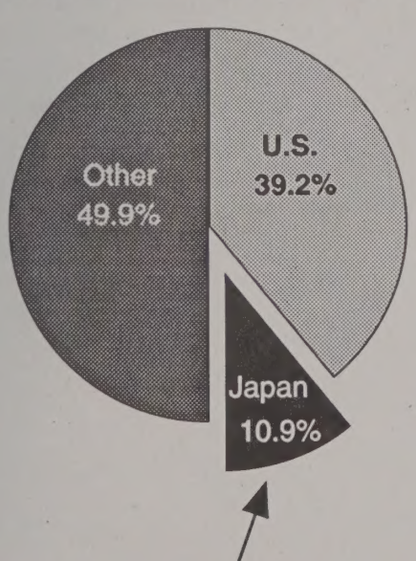


Total Units: 2,304,000

Total Value: ¥1,407,204

Source: IDC Japan, 1992

Worldwide Packaged Software Revenue, 1992



Japan Revenue: $6.452B

Total Worldwide Revenue: $59.381B

Source: IDC, 1992

Japan's Computer Vendors Hit Hard by Sluggish Markets, High Yen in First Half of FY92

Because their share of the worldwide IT market far outweighs the 35% of global spending represented by the United States, U.S. vendors' results play a key role in IDC analysts' views of current spending trends. However, IDC's international projections also take into account domestic and other non-U.S. players. While important in Europe, this dimension is absolutely critical in Japan, where the IT market, which now accounts for almost a fifth of worldwide spending, is still dominated by a handful of domestic manufacturers.

In the Oct. 30 issue of the *IDC Japan Report*, a monthly newsletter now in its 18th consecutive year of publication, IDC Japan reported the bad news. Five of the largest Japanese electronics giants, each of which has total revenue between $20 billion and $30 billion, are projecting stasis in revenue for the fiscal year ending in March 1993 and steep dips in pretax profits. (see chart below).

These projections compare poorly with the 5.6% average pretax margin over the first three quarters of 1992 for U.S. vendors if IBM's results are discounted and even with the 2.4% average pretax margin, including IBM. In fact, of the 99 U.S. companies in the database with pretax results, 68 have so far done better in 1992 than the projected pretax margin for Hitachi, which is the most optimistic of the five.

These results include non-IT related revenue, notably for Hitachi and Mitsubishi, and also factor in the weak worldwide economy outside Japan and an unfavorable yen/dollar shift during the April-September 1992 period that depressed returns from the U.S. market compared with the same six months in 1991.

The primary explanation for the weak balance sheet, though, is the bursting of the "bubble economy" and its effect on domestic Japanese IT spending. We have therefore extracted from the *IDC Japan Report* the domestic Japanese IT results and projections for the same five companies plus Oki and converted the data into U.S. dollars at a rate of 127.5 yen to the dollar (see tables, pg 5).

The results would be dismal anywhere; for companies that had been feasting on double-digit growth, they must be traumatic.

Domestic IT revenue for the six vendors was down an overall 5% for the first six months of the fiscal year. Expectations for the next six months are for a flat market, and even that projection hinges on the (probably unrealistic) hopes of NEC for fast results from the Japanese government's new pump-priming programs. The net result would be an overall 2% drop in domestic revenue for the six companies.

Based on the results of our survey of 1,400 user sites in Japan earlier this year, IDC has not been bullish on the Japanese market, with only 5% growth projected. This now seems high, since the six companies profiled represented nearly 60% of the Japanese IT market in 1991. Everyone else would have to grow at an average of around 15% to reach a modest 5% overall rate of expansion; with IBM Japan accounting for the largest share of the missing companies, this is not going to happen.

IDC will therefore be revisiting its forecasts for Japan; U.S. vendors, on the other hand, can continue to view 5% overall growth in Japan as a reasonable goal. The difference, which appears in the far right column in

Top Japanese Electronics Companies' 1992 Projections

Company	FY92 Revenue Change (E)	FY92 Pretax Change (E)	Pretax Income/ Revenue Change (E)
Fujitsu	+1.5%	-57.5%	0.7%
NEC	0.0%	-70.0%	0.8%
Hitachi	-3.2%	-53.4%	1.6%
Toshiba	+2.0%	-51.9%	1.0%
Mitsubishi	-2.7%	-61.0%	0.9%

Source: IDC Japan, 1992

the tables at right, is the boost U.S. companies doing business in Japan received from currency shifts in this period. The catch is that the dollar has strengthened over the past two months.

Following is an outline of recent results and an outlook of near-term prospects for the largest Japanese suppliers.

Fujitsu

Japan's No. 1 computer vendor, Fujitsu Ltd., posted a consolidated net loss of ¥19.2 billion for the first half of the 1992 fiscal year, compared with a ¥10.3 net profit the year before. Fujitsu reported that unconsolidated net profits for the six-month period fell 82.4% to ¥3.55 billion, while pretax profits plummeted 86.5% to ¥4.44 billion on sales of ¥1.15 trillion.

Fujitsu registered minus growth in computer revenue in the domestic market for the first time in the company's history. This was mainly the result of stagnate sales of medium- to small-scale M-series mainframe computers, K-series office computers, FMR PCs and banking terminals. On the brighter side of the ledger, new large-scale M-1600 models, S-series workstations OEMed from Sun, ICL DRS 6000-based DS/90 7000 workstations and PCs all registered growth in domestic markets. Brisk sales of Fujitsu's 3.5-inch disk drives in U.S. markets also helped the company post record export growth of over 20% during the same period. Due to the prolonged slump in the national economy and high yen exchange rates, however, projections for both domestic sales and exports have been adjusted downward by ¥80 billion to ¥1,820 billion.

Japanese Vendors' IT Business in Japan ($M), 1st Half FY92 and Projected 2nd Half and Entire FY92

Company	Apr-Sep 1992	Apr-Sep 1991	Yen Change	U.S.$ Change
Fujitsu	$5,800	$5,810	-0.2%	7.5%
NEC	$4,975	$5,225	-4.8%	2.5%
Hitachi	$3,530	$4,005	-11.9%	-5.1%
Toshiba	$1,615	$1,685	-4.1%	3.3%
Mitsubishi	$730	$760	-4.1%	3.3%
Oki	$660	$740	-11.0%	-4.2%
Subtotal	$17,310	$18,225	-5.0%	2.2%

Company	Oct 1992-Mar 1993 (E)	Oct 1991-Sep 1992	Yen Change	U.S.$ Change
Fujitsu	$6,630	$6,735	-1.6%	2.2%
NEC	$6,595	$6,115	7.8%	11.9%
Hitachi	$3,685	$3,945	-6.6%	-3.2%
Toshiba	$1,735	$1,806	-3.9%	-0.4%
Mitsubishi	$985	$1,055	-6.6%	-2.7%
Oki	$1,010	$980	3.1%	7.1%
Subtotal	$20,640	$20,635	0.0%	3.8%

Company	Apr 1992-Mar 1993 (E)	Apr 1991-Mar 1992	Yen Change	U.S.$ Change
Fujitsu	$12,430	$12,545	-0.9%	4.6%
NEC	$11,570	$11,340	2.0%	7.7%
Hitachi	$7,215	$7,950	-9.2%	-4.2%
Toshiba	$3,350	$3,490	-4.0%	1.3%
Mitsubishi	$1,715	$1,815	-5.5%	-0.3%
Oki	$1,670	$1,720	-3.0%	2.4%
Subtotal	$37,950	$38,860	-2.3%	3.1%

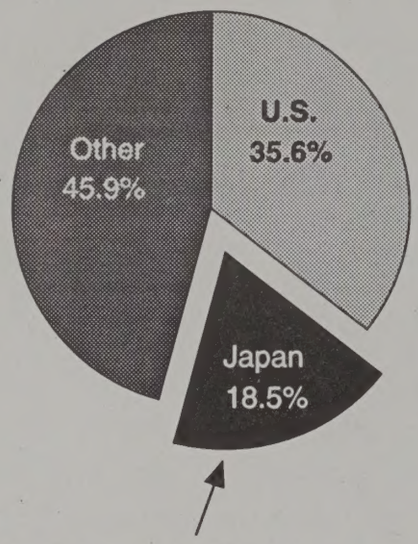
*Yen converted to U.S. dollars at six-month 1992 average of 127.5 yen/U.S.$; dollar growth column based on average of 137.3 yen/U.S.$ in the April-September 1991 period, and 134.57 for the full year 1991.

Source: IDC Japan, 1992

Looking forward, Fujitsu has launched several important strategies, all related to software and services. The Professional Total Support Service, dubbed PROPOSE, is a series of integrated service products that had been previously bundled to Fujitsu hardware sales. PROPOSE groups services into three main categories presented in service "menus," including applications; system environments, consisting of hardware, systems software and networks; and engineer skill development. Through PROPOSE, users can select and pay for only those services they really need. Fujitsu expects to earn ¥4 billion, nearly one third of total domestic IT revenues, from PROPOSE menu offerings and other SI services during FY92.

Fujitsu also launched a strategy to strengthen program product sales to 1) make program products that work on M-series mainframes operate on Fujitsu's FMR PCs and workstations, and 2) to make Fujitsu program products operable on other vendors' computers to appeal to users in multivendor environments. Several products are to be covered in the plan, including database management systems (DBMS), distributed solution management, on-line transaction processing (OLTP), telecommunication software, CASE tools, compilers, and OA tools. Kicked off in May with about 1,000 staffers, joint development of products such as OLTP and Unix-based distributed solution management are being implemented with overseas partners including ICL. Fujitsu is aiming for ¥40 million in sales in FY92 and hopes to double this figure to ¥80 billion by FY95.

Worldwide IT Market, 1992



Japan Revenue: $65.891B

Total Worldwide Revenue: $355.443B

Source: IDC, 1992

NEC

NEC's consolidated pretax profits plummeted 71% from the same period last year to ¥15.12 billion. Even NEC's bread-and-butter products, PCs and office computers, declined, by 6.5% and 36%, respectively. Sales of ACOS-series mainframe computers were also stagnant compared with the previous year, dropping by 24%.

Despite this poor showing, and in sharp contrast to Fujitsu forecasts, NEC is rather upbeat about the outlook for the second half of the year, projecting 6% growth in overall domestic and export computer sales to ¥900 billion. NEC's optimism is tied to confidence that government initiated "emergency" anti-recession policies will sufficiently prime the economy. Should NEC reach this goal, full FY92 computer sales would be up 1%, reaching ¥1,590 billion. Domestic PC sales, however, aren't expected to be bolstered by government programs. Overall PC sales will likely drop by 11%, totaling ¥500 billion for FY92.

NEC recently announced a new systems integration concept dubbed Solution 21, which consists of three categories: Systems Approach, setting basic policies in system development; SI Service; and Product Group, for facilitating system development. Through promotion of the new SI concept, NEC intends to increase SI software and services revenue from 30% of total domestic IT revenue in FY91 to more than 40% in FY95, when sales are expected to reach $8 billion.

Hitachi

Hitachi's pretax profits plunged 53.2% compared with last year to ¥37.52 billion on sales of ¥1.9 trillion, down 5.6%. The company projects full-year pretax profits of ¥90 billion, down from ¥128.87 billion the year before, on sales of ¥3.8 trillion. Hitachi suffered from sharp declines in computer sales in both domestic and export markets for the first half of the 1992 fiscal year. Stagnant banking and securities markets in Japan had the most negative impact on Hitachi's large-scale mainframe business, while cutthroat competition in U.S. and European computer markets was blamed for Hitachi's woeful showing in OEM exports of mainframe hardware and disk drives.

Hitachi anticipates a prolonged business slump in all domestic computer markets, project-

ing a continued dip in large-scale mainframe, PC and workstation sales for the rest of FY92. Hitachi went so far as to predict that domestic markets would not show any signs of a recovery before the end of the first half of fiscal 1993, at the earliest.

Hitachi recently launched a new information systems concept, FOREFRONT, which is designed to enable use of both Hitachi and non-Hitachi PCs and workstations in distributed processing environments controlled by Hitachi mainframe computer systems. Rather than aiming at sales of Unix-based client/server systems, under FOREFRONT, Hitachi defines a mainframe system as a total management server of which the key responsibility is to gather and store data from client/server systems at end-user departments. Thus, as Unix mainframe markets expand worldwide, Hitachi hopes more of its highly regarded DASD products will be introduced by users regardless of architectural differences in mainframe systems.

IBM Japan

The Japanese subsidiary of Big Blue has separated local operations into three separate entities to include an IBM "core" company, a medium-to-small customer-oriented information systems company and a service business company. The core company, further subdivided into a large customer-oriented industrial systems group and an R&D and production group, generated ¥1 trillion ($8.3 billion) in revenues last year. This operation is in charge of large accounts that maintain information systems departments and install mainframes.

The ¥200 billion/year, medium-to-small account operation typically handles individual users and clients installing AS/400-type machines with no IS department. This category of user is believed to have vast growth potential, however, it is an area in which IBM Japan has little know-how in meeting customer needs. At the outset, the new company will emphasize a so-called "information systems reforming business" in which AS/400-based management information systems will be built along with PS/SS PCs and various graphics software. The ¥170 billion per-year service business will focus on new customer service areas such as outsourcing and consulting services in addition to traditional hardware and software maintenance services.

By making individual IBM businesses more maneuverable, the restructuring should speed up responses to customer needs and improve earnings. In order to avoid any possible conflicts between the three companies, a management committee has been set up, including Chairman Shiina; newly appointed core company president Kakutaro Kitashiro; information systems company president Tatsuyki Saeki; service business company president Hideki Kurashige; and three other senior executives.

Toshiba

Toshiba reported that compared with the same period last year, the company's unconsolidated pretax profits fell 38.9% to ¥23.55 billion on sales of ¥1.51 trillion for the first six months of FY92. Toshiba, as well, attributed slow PC markets both at home and abroad for the company's static computer revenue growth. Toshiba did, however, enjoy brisk sales of 3.5-inch hard disk drives (HDD) in both domestic and overseas markets. The company also expects to benefit from government "pump priming" programs with sales of minicomputers to be incorporated into traffic control, power and other utility systems during the latter half of the year.

Nonetheless, total domestic revenue will remain flat for FY92. On the other hand, exports of 3.5-inch HDDs and low-end notebook PCs to the U.S. are expected to grow, contributing to 2% overall growth in computer revenues over the previous year.

Mitsubishi

Mitsubishi Electric reported that its unconsolidated pretax profits sank 73.7% to ¥12.33 billion compared with last year. Sales of RISC workstations OEMed from Sun and software/services were the only bright spots in the company's computer businesses, as sales of Mitsubishi's PCs and office computers and mid-range mainframes OEMed from IBM suffered 10% to 15% declines over the first half of FY92. The company remains pessimistic about the latter half of the year as well and predicts that overall computer sales for the entire fiscal year will drop by 7.2%, compared with FY91.

Three Key Issues in Today's IT Markets in Japan

How different is Japan? Like much of the worldwide IT market, three very important issues in Japan IT are downsizing, solution services, and open systems.

Japanese users and vendors alike have been heavily dependent on large-scale mainframe systems that operate with proprietary OS. For their part, users have preferred to use the customized software usually bundled with the purchase of the hardware system.

The Japanese IT community's interest in downsizing parallels those of similar IDC surveys conducted in the U.S. and Europe. However, the market shares for PC/workstations relative to overall systems remain significantly lower and large-scale mainframes remain somewhat higher than in other world markets.

Many different factors contribute to the discrepancies between Japan's IT markets and other world markets — organizational or corporate structure and management styles, socio-economic and cultural background, and corporate computer use styles.

Most corporations are centrally organized, which determines the very close relationships maintained with various vendors to implement and manage the "kamban" or just-in-time (JIT) systems that require a centralized computer base. Senior-level management maintains a low level of involvement in IT strategies, and the role of the corporate "information officer" is still rather limited This situation doesn't allow for a climate in which many revolutionary changes in processing styles can take place. Also, DP department leadership still tends to be rather conservative, resulting in a significant backlog in large-mainframe software development.

In addition, domestic PC vendors, including Japan's PC giant, NEC, with over a 50% share of the market, maintain vendor-specific PC OS. This severely limits the use of the world's most popular packages from IBM and Macintosh, as well as limiting the variety of packages available for locally made PCs. Acceptance of Unix has also been slow, generally due to the nominal number of software houses familiar with Unix.

But change may be in the wind. JIT systems have come under increasing criticism for adding to Japan's horrendous traffic and air pollution problems, even within the auto industry where these systems were so successfully implemented. Younger people entering the work force are more familiar with keyboards, thanks to the many word processing and PC or PC-type products from a multitude of vendors that continue to enjoy their greatest success with the nation's youth. ISDN is being more widely implemented in the nation's larger cities as well.

PC suppliers are joining the DOS/V group and launching DOS/V-based PC models to enable users to run application software on any vendor's PC hardware. Since IBM Japan's announcement of open DOS/V PC OS, designed to enable VGA-based IBM PC/AT clones to implement Japanese language drivers providing users with kanji handling capabilities at a very low cost, an increasing number of domestic suppliers are shipping DOS/V. Shipments of Apple Macintosh PCs have been steadily increasing since the company made low-cost versions available in Japan, and Apple was the only company to more than double PC sales in FY91, a dismal year for most vendors.

Downsizing in Japan is also ushering in changes in end-user relationships with the corporate MIS department, the computer vendor and the solution service vendor. The MIS department played the major information processing role in the '70s and '80s, but as end-user departments use PCs and workstations in combination with packaged software for local processing and strategic planning at both corporate and local levels, there will be increased computer investment at end-user departments and declines in large-scale budgets.

Solution service vendors, including third-party software houses, VARs and systems integration service vendors are providing consulting and systems integration services to end-user departments. Some MIS departments are creating spin-off companies to provide solution services as well. For their part, computer manufacturers have been shifting the emphasis from hardware to solutions and software, and although most access to end users is through the MIS department, gradually we will see more direct end-user contact made by computer vendors.

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Packaged Software: IT's Fastest Growth Segment Despite Price Wars, Platform Questions

The worldwide market for packaged software — languages, operating systems, tools and applications — will grow by over 13% to reach almost $60 billion in 1992. While the growth of most other market segments, most notably systems hardware, has slipped dramatically in the past two years, software growth has slowed only slightly from the 20% of the previous half decade.

Importantly, that's only part of the story. Many large computer users spend as much internally on software development as they do externally on packaged software. According to IDC's latest software spending research at major IS sites, internally developed applications represent slightly over one-half of all software spending. While packaged software spending continues to grow, internal spending is flat, however.

By almost any measure, software remains the fastest-growing and most vital component of the worldwide IT market. It presents the broadest opportunities for established vendors and entrepreneurs alike, despite aggressive price cutting, dampened industrywide expectations overall, and the near-paralytic effect of downsizing and rightsizing on users. The following trends are shaping competition in the software business:

- Price wars. Compaq and IBM got the headlines even while Lotus and Microsoft slugged it out over the past two months, mostly because hardware price wars make for easier copy. No more. Software competition has reached the boiling point. Microsoft and Borland are deep into a database price war. In fact, if during the antitrust days of yore IBM ever tried the mainframe equivalent to Microsoft's $79 offer to Borland users, the Feds would've laughed all the way to the local circuit court. Price cutting will increase unit volumes and lower margins, and may hurt smaller software upstarts.
- Changes in business practices. Tracking and installing new revisions and versions, and managing multiple-site software installations and licenses, have long been big user concerns. Software companies are finally responding. Computer Associates has simplified its pricing and delivery structure with a site license arrangement under which customer costs are tied to installed MIPS, regardless of size or distribution of individual CPUs. Other mainframe

IN THIS ISSUE:

Worldwide Packaged Software Revenue, 1992 and 1996 3

PC Software Price Wars 3

Worldwide IT Revenue 1992 and 1996 4

Workgroup Applications, Workflow Software 5

Software Company Financial Results 6

Workgroup Software Profiles:
Action Technologies 5
Beyond Inc. 5
Digital Equipment 5
Hewlett-Packard 5
Lotus Development 7
Microsoft 7
NCR 7
Reach Software 7

Publishing and Software : How Similar? 8

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software suppliers will be altering their delivery, pricing, and sales strategies to avoid getting left in the dust.

- Groupware: the next big thing? Much of the industry's growth over the next few years will be derived from new kinds of applications: groupware and workflow. Some of them are indeed new ways of recording, moving, manipulating and communicating data. Others are means of siphoning applications off large systems and onto networked PCs. Both represent a new way to solve organizations' communication and information problems. Customized solutions built around products like Lotus's Notes may represent the industry's biggest growth opportunities.

- Can PC software companies grow up to groupware? Two issues: building and selling multiuser applications is more difficult than building and selling single-user applications. And, developing ingenious new applications for specific business functions is, most fundamentally, a very different activity than supporting users of general-purpose applications. PC companies, accustomed to more simple development and support activities, need a clear strategy for managing both transitions to a more difficult competitive environment.

- Reuse hullabaloo. Object-oriented programs and portable objects are meant to minimize the replication of effort endemic in every large programming effort. So far it's more hype than help because users are reluctant to invest significant manpower in an untried production method; suppliers are only now unveiling the first truly object-based systems. Nonetheless, developing workable software reuse scenarios will continue to capture users' attention (if not resources) although truly portable code is still a ways off.

- Programmer glut, application backlog ... ? Ask many front-line IS users and managers what's wrong with their MIS departments and you'll hear something about application backlog. In general, MIS can't write new applications fast enough for users. That's why some economies have placed a major emphasis on training armies of programmers and building offshore programming factories. The current shortage of programmers may turn into a glut in the coming decade. But whether that can translate into happy users running modern applications — and buying new toolsets, versions and developer's kits — remains to be seen.

How will rapid growth and changed dynamics affect the structure of the worldwide software industry? PC hardware consolidation seems increasingly apparent. But how about software? Is further consolidation likely? Or, will software companies refocus on niche strategies?

One primary driver of PC hardware consolidation is scale economy. A bigger PC company can make more PCs less expensively than two smaller companies can. The same analysis holds less true in the software business.

Economies of scale in the software business are barely connected to levels of production output. The name of the game is marketing and distribution. To wit: Microsoft can buy Fox and a previously obscure, unheard of, and difficult to get ahold of, database product has instant legitimacy and growing market share.

Consolidation in the computer software business is a means of obtaining distribution channels and marketing presence. That seems at odds with trends in other software businesses — book, record and film publishing. In those businesses, the most efficient structure seems to be almost complete separation between artist and distributor.

Which companies might be the most likely candidates for acquisition or consolidation? Because many of the smaller, traditional PC software companies sell through easily accessible distributors, they are probably not. Beyond situations where complementary products offer strategic synergies, smaller, traditional PC

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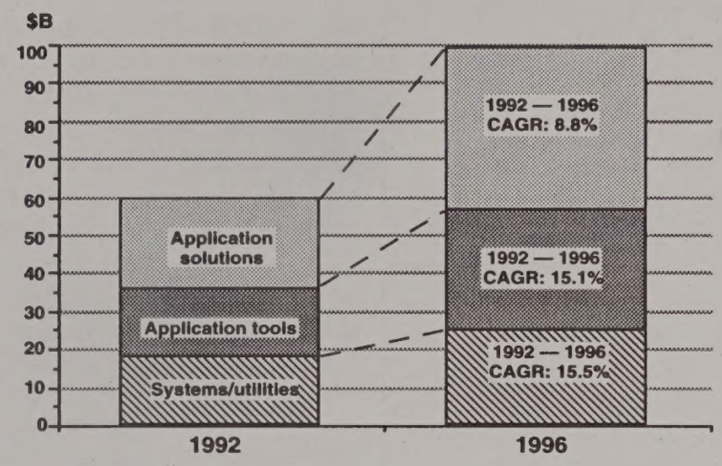
software companies may be most efficient operating as independent units.

Groupware-oriented companies, however, are a different story. High-end groupware is sold through direct sales forces. Sales take longer, because they are more complex. Software industry consolidation activity will be centered around small networking software companies.

Growth? IDC expects that packaged software will average 13.5% growth over the next five years, compounded annually. Even if that is down from earlier growth rates, it's still pretty healthy, particularly when it is compared to worldwide GNP and GDP growth rate and other industry and segment growth rates. The following articles examine the issues that will drive growth and change in the computer software business.

Worldwide Packaged Software, 1992 and 1996



	1992 ($M)	Share	1996 ($M)	Share
U.S.A.	23,300	39.2	38,900	39.4
Japan	6,452	10.9	12,313	12.5
Germany	5,177	8.7	8,987	9.1
U.K.	4,323	7.3	6,082	6.2
France	3,754	6.3	5,710	5.8
Italy	3,337	5.6	5,359	5.4
All others	13,038	22.0	21,491	21.6
Total	**59,381**	**100.0**	**98,842**	**100.0**

Source: IDC, 1992

Software Price Wars Come Into the Spotlight

Talk about jumpy. Wall Street should be sensitive to price wars. But its sensitivity to PC *software* price wars last month bordered on overreaction.

On one hand, it's easy to understand why Wall Street fears price wars. Lower prices mean lower marginal profit. But *even with* hardware price wars on everyone's mind, that a lower price might increase unit sales of horizontal-applications software seems to have been forgotten.

And there's more — much more. The ambiguous relationship between a software product's marginal cost and its price means that price wars may have the opposite effect than they have had in the hardware business.

Here's what happened last month. Analysts adjust companies' projected revenues and earnings almost daily. A single Wall Street analyst mentioned the word "price" while lowering his estimates of Microsoft's third quarter profitability. The effect was dramatic: Microsoft's market value dropped by over a billion dollars in one day.

While intense price competition has been the rule in the PC software market for four years, the Microsoft epsiode demonstrates it is generally poorly understood. Particularly when it is compared to PC hardware price wars.

Hardware pricing and price wars are very clear-cut. They're based upon a rigid comparison of features, list prices, and discounts. Prices drop and drop, until they barely cover the marginal costs of the components in each unit. The relationship between marginal cost, price, and profit is very direct. For a manufacturer to remain viable, prices can drop only to some small amount above the marginal production cost.

Software is much more abstract. Ultimately, the marginal cost of consumer (horizontal-market) software is very close to the price of the diskette upon which the product is delivered.

Continued, next page

Software Pricing, cont.

On top of that, however, is an ambiguous mix of sunken and fixed costs — an expenditure of resources to fund the programmers that wrote the code and the organization that supports it.

The gap between the actual marginal costs and the cost of the diskettes creates problems. On the hardware side of the business, the equilibrium price is roughly 20% over marginal production cost. On the software side, the search for an equilibrium price has a very low basement. Yet even at very low prices, software companies may be making a profit.

As a result, PC software price wars are not as immediately threatening as hardware price wars. At least software companies do not need to worry about losing money on raw materials, as do hardware companies. Nonetheless, software price wars are causing immediate reaction.

In 1989, with new-user sales slowing for almost all suppliers, Borland offered 1-2-3 users an $89 price to switch to Quattro. Other applications providers followed. By 1990, the $129 Windows upgrade was almost a requirement for major word processing suppliers. Early last year the price wars entered a new phase: suppliers offered three or more Windows applications for $600-750.

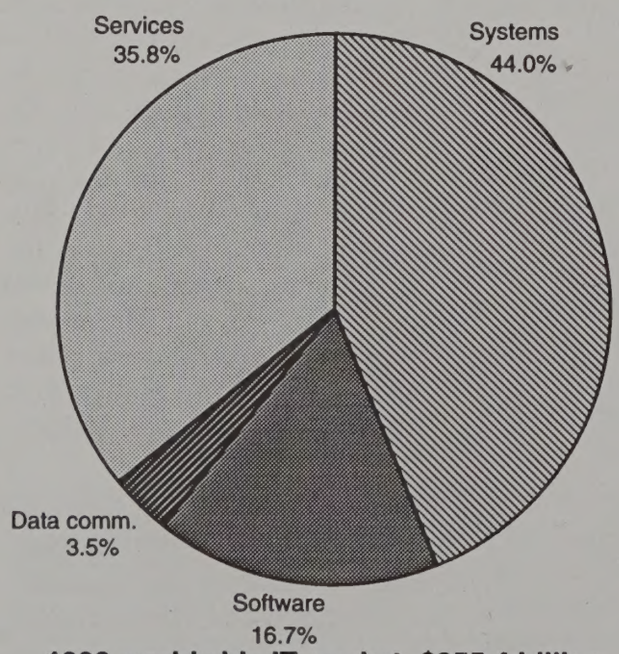
Where has the price competition been most intense? In the Windows applications segment. Average prices for Windows applications dropped by 34% between 1990 and 1991, while average prices for DOS applications held almost steady.

What are the ramifications of the price wars? Market share consolidation. Look first at word processing, a bellwether application market (and perhaps the most significant, since users spend over 50% of their PC time using WP).

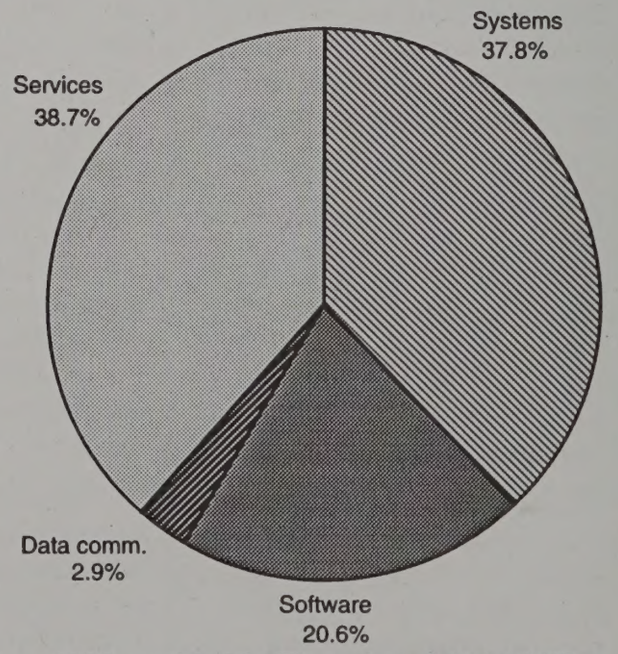
The DOS WP market, perhaps the most mature application market is undergoing a strong consolidation of market share. In 1990, Wordperfect held 44% of shipments; in 1991 it held 65%. The number of suppliers with a significant share (over 0.2% of the worldwide market) dropped from 14 to 9. And that is still a lot for a single application market.

As a result, smaller PC software suppliers are being punished. Microsoft and Lotus have rounded out their range of applications to include a complete set: word processing, spreadsheet, draw, and mail. Since few small software companies can compete with such a broad range of applications, the pressure in the future will be even more intense.

Worldwide IT Markets by Hardware/Software Categories, 1992 and 1996



1992 worldwide IT market: $355.4 billion



1996 worldwide IT market: $479.9 billion

Source: IDC, 1992

PC Software Companies Get the Jump on Workgroup Applications

Some of the most visible software development work these days revolves around two different but similar concepts: workgroup applications software and workflow software. What exactly are the new products? IDC notes the following distinctions:

- *Workflow software* is a tool or set of tools that empowers individuals and groups of individuals in both structured and unstructured work environments to automatically manage a series of recurring and nonrecurring events in a way that achieves the business objectives of the company. Simultaneously, workflow software should allow feedback to management ensuring the opportunity and ability to extend or modify those business practices and the business environment changes.
- *Workgroup applications* are designed to assist, expedite, manage, or otherwise enhance the process of completing goals that inherently require the participation of multiple members of a workgroup. Workgroup applications are designed from the start to run on a LAN. They facilitate the activities of a group, and are intended for interactive use.

Both types of applications are somewhat of a middle ground for software suppliers. Established PC software companies are trying to grow multiuser applications out of their base of PC applications. Mainframe software companies have been trying to grow down, to make money selling networked PC software.

So far, PC software companies have the upper hand. Lotus has the hottest product — Notes. Mainframe software companies, and office automation suppliers, appear to be having a very difficult time developing and selling groupware.

Why have older and host-oriented software companies fared so poorly? Mainframe-oriented software suppliers tried to shrink mainframe-based applications to run on LANs. But they did so without adding sufficient incremental functionality (beyond that offered by personal productivity applications) to give users a reason to buy. Most mainframe-oriented suppliers' attempts to crack the workgroup application market merely offered the same functions as host-based packages, only they were LAN-based. Another reason for their failure has been that host-based software suppliers did not speak the language of the PC software industry — much shorter development cycles and GUIs, for example.

Groupware Supplier Profiles

Established, older host-based software suppliers and upstart PC software companies alike are developing workgroup applications and workflow software. Following is an update on group-oriented software suppliers' strategies and products:

Action Technology was the original developer of MHS (message handling service), the LAN message handling standard. The company's Workflow Management System is a suite of standard software components that imbue applications with workflow services. In essence, they endeavor to make workgroup applications into workflow software. Action is working as a Lotus Alliance Partner to enhance Notes with workflow methodology and design components.

Beyond Incorporated's flagship product is BeyondMail, a cross-platform enterprise messaging system that combines rules and forms to provide workgroup applications. BeyondMail uses rules to sort through bundles of e-mail. Recently Beyond has begun working with larger e-mail suppliers to tap a broader user base. BeyondMail was integrated with Lotus Notes and Windows for Workgroups this fall.

Digital Equipment's TeamLinks includes powerful messaging and forms routing features, but its heavy reliance on Digital platforms limits its broader appeal. Customers that already have VAXes, that use All-In-1 and that rely on Pathworks to link PCs to their VAXes will find TeamLinks attractive. TeamLinks e-mail is powerful, well integrated with other applications, and easy to use. TeamRoute lets users automate a forms approval process.

Hewlett Packard's workgroup applications product, NewWave Office, was a unique office computing solution when it was first released over two years ago. But it never really got off the ground. Now updated and renamed Cooperative Computing Solution for Knowledge Workers, HP is again on the offensive. CCSKN includes an updated OpenMail e-mail package, a new document manager, new database access tools, and WorkRouter, HP's first attempt at workflow software.

Continued, page 7

Software Financial Results: Strong Third Quarter

Overall, the software industry is experiencing significant growth, with revenues from the companies captured in IDC's database of publicly traded companies increasing 21.1% in the third quarter.

As downsizing and distributed computing trends accelerate, the high-end software market is faced with many new growth opportunities fueling strong performance in several key areas of multiuser and network software. Unix database software in particular continues to thrive as reflected by strong showings from Oracle and Sybase. End users are now moving to the next step of database implementation and interconnecting databases and applications across networks. IDC's already aggressive Unix RDBMS forecast will be revised upward.

In general, vendors are winning by providing a level of functionality and service/support above that of their competitors. Thus far, there is no threat of price

Revenue for Selected Software Companies

	($M) Q3 92	($M) Q3 91	% Change	Q1-3 92	($M) Q1-3 91	% Change
Aldus	45.3	40.3	12.4%	128.2	124.8	2.7%
Ask Computer	83.7	74.9	11.8%	334.3	287.6	16.2%
Bachman	8.1	9.2	-12.0%	35.8	27.9	28.5%
BMC Software	57.5	43.5	32.1%	164.0	125.9	30.3%
Boole & Babbage	28.7	24.7	16.2%	82.8	74.0	11.8%
Borland	127.8	113.9	12.2%	359.4	384.8	-6.6%
Cadence Design	106.5	96.3	10.5%	313.7	281.5	11.4%
Computer Associates	431.9	332.8	29.8%	1,269.3	979.6	29.6%
Comshare	28.7	28.8	-0.6%	86.2	91.3	-5.6%
Cybertek	7.2	7.2	0.0%	21.3	21.6	-1.6%
Data I/O	17.4	15.9	9.5%	50.5	49.0	3.0%
Easel Corp.	8.0	7.7	5.0%	23.3	19.2	21.4%
HBO & Co.	50.7	43.4	16.9%	141.4	120.5	17.4%
Hogan Systems	16.2	14.2	14.0%	48.1	43.7	10.0%
Information Resources	71.7	55.1	30.1%	195.7	156.6	25.0%
Informix	68.2	48.3	41.1%	187.6	126.0	48.8%
Intellicorp	1.9	2.0	-4.6%	6.7	9.3	-28.2%
Interleaf	28.4	23.3	21.8%	84.3	67.4	25.1%
Knowledgeware	29.4	21.6	36.3%	90.3	92.7	-2.6%
Legent Corp.	124.4	103.8	19.9%	260.4	207.2	25.7%
Lotus	206.7	218.8	-5.5%	654.1	579.7	12.8%
Mentor Graphics	77.5	94.7	-18.1%	266.7	293.1	-9.0%
Microsoft	818.0	580.5	40.9%	2,314.3	1,594.0	45.2%
Oracle	306.9	244.7	25.4%	956.7	801.3	19.4%
Software Pub.	36.9	37.7	-2.2%	115.3	100.1	15.2%
Sterling Software	74.6	62.9	18.7%	203.1	170.0	19.5%
Sungard Data	82.5	71.8	14.9%	232.2	208.2	11.5%
Symantec	43.7	54.3	-19.5%	166.2	127.6	30.3%
Systems Center	31.8	30.7	3.6%	93.8	88.1	6.5%
Total	**3,020.4**	**2,503.0**	**20.7%**	**8,885.7**	**7,252.9**	**22.5%**

Financials, cont.

wars in the database market or any other high-end software segment. However, pricing will remain a key component of systems level software and many vendors are presently examining pricing strategies and moving towards a concurrent-use licensing policy. The key for suppliers is not lower pricing, but pricing structures that make it easier for customers to configure and buy their software products.

Revenue growth in the PC software market was not as solid in comparison with the system software market, but unit growth remained strong. PC software vendors are currently in a heated battle for market share — especially in the Windows market — with volume a key component in their strategies. This coupled with end-user demand for concession to keep pace with lower prices for PC hardware, is pushing the PC software market closer to an all-out pricing war.

The lowering ASV is seen in many segments of the PC software market, but is most apparent in the Windows market as vendors scramble for share attempting to lock customers into their suite of Windows products. This trend is exacerbated by the faster-than-expected migration to Windows (spurred by PC price cuts at the high-end).

Even the PC database market is experiencing pricing pressures. Microsoft, using its typical aggressive strategy, introduced its newest database product, Access, at a greatly reduced price. As a result, Borland, the current leader in the PC database market, lowered its prices.

Workgroup Suppliers, cont.

Lotus Development has made the biggest splash in the workgroup applications market. Its Notes product was developed by an independent team — Iris Associates — in 1989. Notes is a true application environment, allowing a broad range of customizing. Notes is sold by Lotus's own direct sales force, as well as by IBM (in lieu of OfficeVision for the LAN), VARs, systems integrators, and alliance partners (that also sell plug-in modules which provide additional features like voice processing and information filtering).

Microsoft recently announced availability of its first workgroup-style product — Windows for Workgroups. But WFW is aimed at only the low end of the workgroup applications market. It is essentially an elaborate e-mail and scheduling application and contains little of the flexibility and comprehensiveness of full-scale workgroup applications. Nonetheless, as an alternative to low-end e-mail products, WFW may be successful at the expense of applications like cc:Mail and NetWare Lite.

NCR Corp.'s Cooperation includes a number of powerful workgroup features. It offers a strong base for building client/server applications. It offers users the ability to build multiple desktops for managing multiple projects and includes a strong calendaring and meeting scheduling package. But Cooperation has drawbacks. It has only recently been released on Unix servers. Client PCs must be running Windows, LAN Manager, and HP NewWave. Cooperation does not support either Macintosh clients or NetWare clients. Cooperation 2.0 will not support version 3.1 of Windows and version 4.0 of NewWave until sometime in 1993.

Reach Software Corporation introduced its first product, MailMAN — an e-mail client that operates with multiple mail transport systems (most notably Novell's MHS) — in 1991. WorkMAN, released this year, is a workflow application environment that is based on LAN-supported e-mail. WorkMAN lets users create mail-enabled routing management programs and launch them across their networks. Reach's two toolkits — WorkMAN Tools and WorkMAN User Tools — are intended to provide different users with the appropriate development environment.

Programmers, Artists and Factories — the Software Publishing Model

Within the broad range of non-hardware IT markets is an equally broad variety of business models. Despite the different models, computer companies that sell software typically engage in at least one of three ways of making money — designing an application, selling it, or servicing it.

Scale economies apply in differing degrees across those activities. The largest software companies realize great marketing and distribution economies of scale. The companies that Lotus and Microsoft acquire get the greatest boost from gaining access to their new owners' deep and wide distribution channels.

On the other hand, in the software business size has no direct positive relationship — and has, perhaps, even a negative relationship — to production economies. No matter how much larger Microsoft is compared to ON Technology, it cannot produce the next copy of an application package much less expensively than ON. The valuable part of the product is the intellectual property contained in the lines of code.

That code, more often than not, has been created by small groups of highly individualistic technicians. Technical artists, really. The best programs have rarely been developed by giant factories of programmers. Large groups of programmers are a far less efficient means of developing excellent code.

In this way, computer software is more like the publishing business than the computer hardware business. Software companies have more in common with book, magazine, music, and film producers than with hardware companies.

In those businesses, separation between artist and distributor has proven to be the most effective and least expensive means of delivering "software" to paying customers. A publisher contracts with highly visible experts who provide top-notch books, columns, and performances. Identifying the market, and delivering the product in the right places at the right prices are the publisher's job.

The software industry is, slowly and surely, moving closer and closer to the artist-distributor metaphor. The largest software suppliers are marketers and distributors. Ownership of raw technical ability, though still significant, is a decreasing component of their sustainable competitive advantage.

Over time, PC software companies will focus increasingly on identifying market demand for new products, outlining products to meet them, and outsourcing the programming to independent experts. That is what software companies do when they bring brilliant programmers here from distant shores. That is, essentially, what Lotus and Microsoft did two years ago when they purchased small companies with strong e-mail products. Hollywood and the computer software industry are indeed becoming more similar, and not just because John Sculley or Bill Gates likes to have lunch with Michael Ovitz or Jack Valenti.

There's one important distinction, however. Computer software companies need to provide their customers with regular updates and upgrades, and they need to provide maintenance and support services. Using software is, quite obviously, a little more difficult than reading a book or playing a CD. And upgrades present a significant revenue opportunity that may very possibly eclipse new sales over time.

Companies like Corporate Software and Software Support Inc. know that. They also recognize that scale economies are great in the software support business and have successfully sought support outsourcing contracts. SSI provides first-line support for some Informix applications, as well as those of several other companies. Many applications developers contract with third-party support firms like SSI and Corporate Software without the knowledge of their customer base.

As companies age, their missions and models may grow out of synch. Much of the growing pain in the computer industry can be ascribed to the difficulty of modifying a business model to accurately reflect a company's actionable assets, its current market stature, and its goals.

In the software business, the move to the publishing model is on. Someday all new software may be developed by independent programming contractors (the stars). It may be fully supported and maintained by independent companies. As the industry's structure gradually evolves, it may be useful to remember that relatively few movie stars become directors or producers, and that not one runs a large studio.

THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | DECEMBER 23 ,1992 | VOL. 28, NO. 3-4 | Published continuously since 1964.

AT&T Moves Into Fast-Growth Markets: Cellular, Digital Wireless, Cable TV, and Services

Analyzing — or, more accurately, ridiculing — AT&T's strategy for entering "the information age" used to be a profitable business for professional pundits. The company's computer business lost money for a decade. Cash generated by its domestic long-distance business seemed relatively poorly spent on Olivetti PCs, mundane 3B2 minicomputers, and Unix development that never paid off for the company.

AT&T has begun to turn it around. In the past two years, it has invested in the nation's largest cellular carrier, acquired NCR and Teradata, introduced a hot new RISC microprocessor, successfully launched a consumer credit card, acquired Easylink (the network and information services company it acquired from Western Union in 1990) and announced a series of wide-ranging partnerships with some of the industry's more innovative companies.

Added to AT&T's undeniably strong core strengths of long-distance services, international telephony, basic R&D, and telecommunications switching expertise, the company is showing signs of succeeding where many technology companies are, right now, not.

For the first few years following the divestiture, AT&T's non-communication businesses were still primarily hardware. No longer. Perhaps that alone is evidence the information age has indeed finally arrived. More importantly, few, if any, other companies are as well positioned to take advantage of the most significant new trends in computing, communicating, and information processing as AT&T. Consider the following:

- Wireless communications services are one of the fastest growing portions of the domestic and worldwide telecommunications market. By investing in McCaw, the company behind Cellular One, AT&T gets instant market presence and is right back in the very profitable local business it completely dominated for 50 years.
- Broadband data, voice and video is attracting attention worldwide as new HDTV and consumer multimedia systems are explored, contemplated and developed. Few companies have either AT&T's broadband switching or transmission expertise. AT&T is currently testing video service delivery with TCI (Tele-Communications Inc. — the U.S.'s largest cable company), local exchange carrier US West, and cable hardware companies Scientific Atlanta and ComStream.

AT&T to Sell USL to Novell
See page 8

IN THIS ISSUE:

Long Distance Revenue 2
AT&T Revenue and Employment 2
IT and Communications Industry Value Chains 3
***Organization:** The Elephant (1984) is Almost Dancing (1992)* 4
***Telecommunications Services:** Slow, Steady Growth* 5
***Silicon:** Hobbit Takes on Intel, ARM, Motorola, Microsoft* 6
***Cellular:** AT&T Rides McCaw Back into the Local Services* 7
UNIX and USL to Novell 8
***International:** AT&T's Next Step* 8
***Universal Card** is Growing Fast, but Where's the Synergy?* 9
***Cable TV:** A Natural Progression for AT&T* 10
NCR Unit has Turned the Corner 11
AT&T Is Back 12

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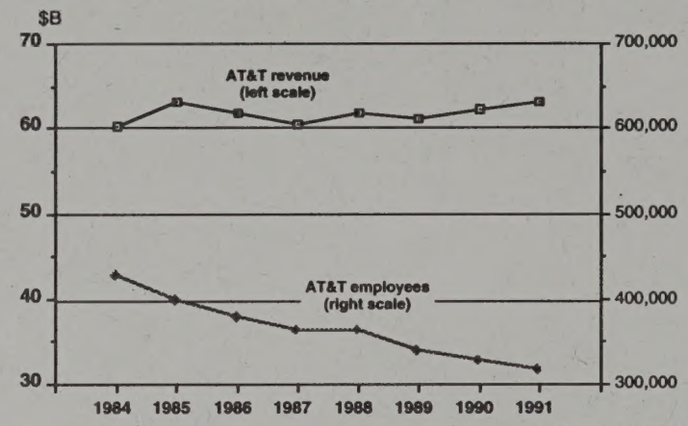
- The merger of personal communicators and next-generation handheld computers may or may not restore growth to the $20 billion worldwide PC market. AT&T's Hobbit RISC microprocessor, which has been specially designed for digital-communications intensive applications, is already being licensed by NEC and Toshiba. AT&T is currently reselling EO System's Hobbit-based personal communicators.
- The assimilation of AT&T's computer operations into NCR started out rough but has smoothed considerably. A flat, or slightly down, 1992 does not look so bad compared with the midrange fortunes of many of NCR's competitors. As high-end databases and database servers adopt an increasingly important role in companies downsizing their IS strategies, the NCR/Teradata combination has a compelling database and low-priced, scalable Unix server story.

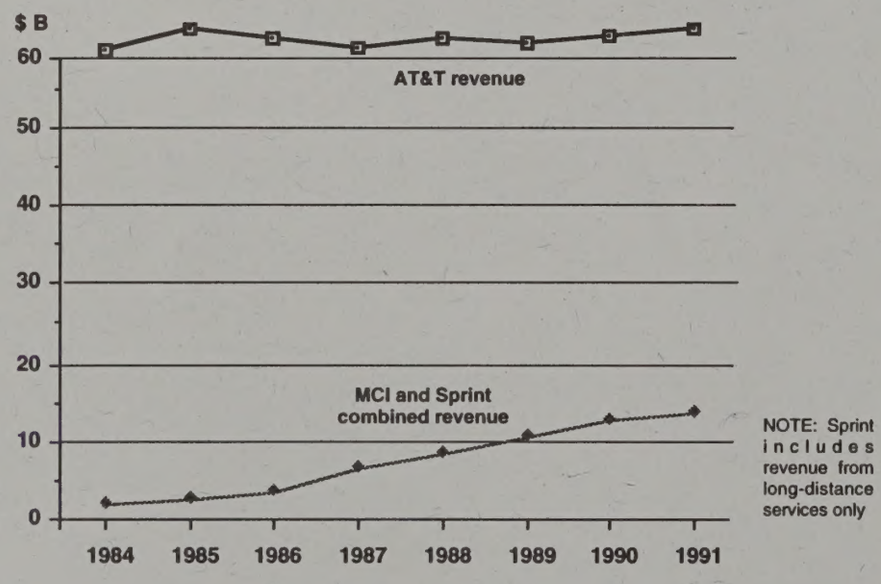
AT&T Revenue and Employees, 1984-1991



Source: AT&T, 1992

For the first three quarters of this century, AT&T was the bluest of the blue chip stocks. Its 1983 revenues of $70 billion were at the very top of worldwide corporations. Revenue and earnings growth was impressive and regular for decades. But since the divestiture of local exchange carriers in 1984, growth has been spotty. That's because it has been steadily losing market share to the two long-distance upstarts: Sprint and MCI, and a host of smaller firms.

Revenue Growth: AT&T vs. MCI and Sprint 1984-1991



Source: AT&T, MCI, Sprint, 1992

For the past five years, revenues have increased from $60 billion in 1987 to $65 billion in 1991, a compound rate of less than 1% annually. The economy has grown faster during that period. Earnings varied from a high of $3.1 billion in 1989 and 1990, to a loss of $1.2 billion in 1988. AT&T's final 1992 results will be better. It posted record third-quarter earnings — $963 million — in 1992. Revenues for the quarter increased almost 4% to $16.2 billion. In light of the hopefully now-ending economic recession, 1993 may be a banner year.

Regardless of short-term success, today's is a brand new

Continued next page

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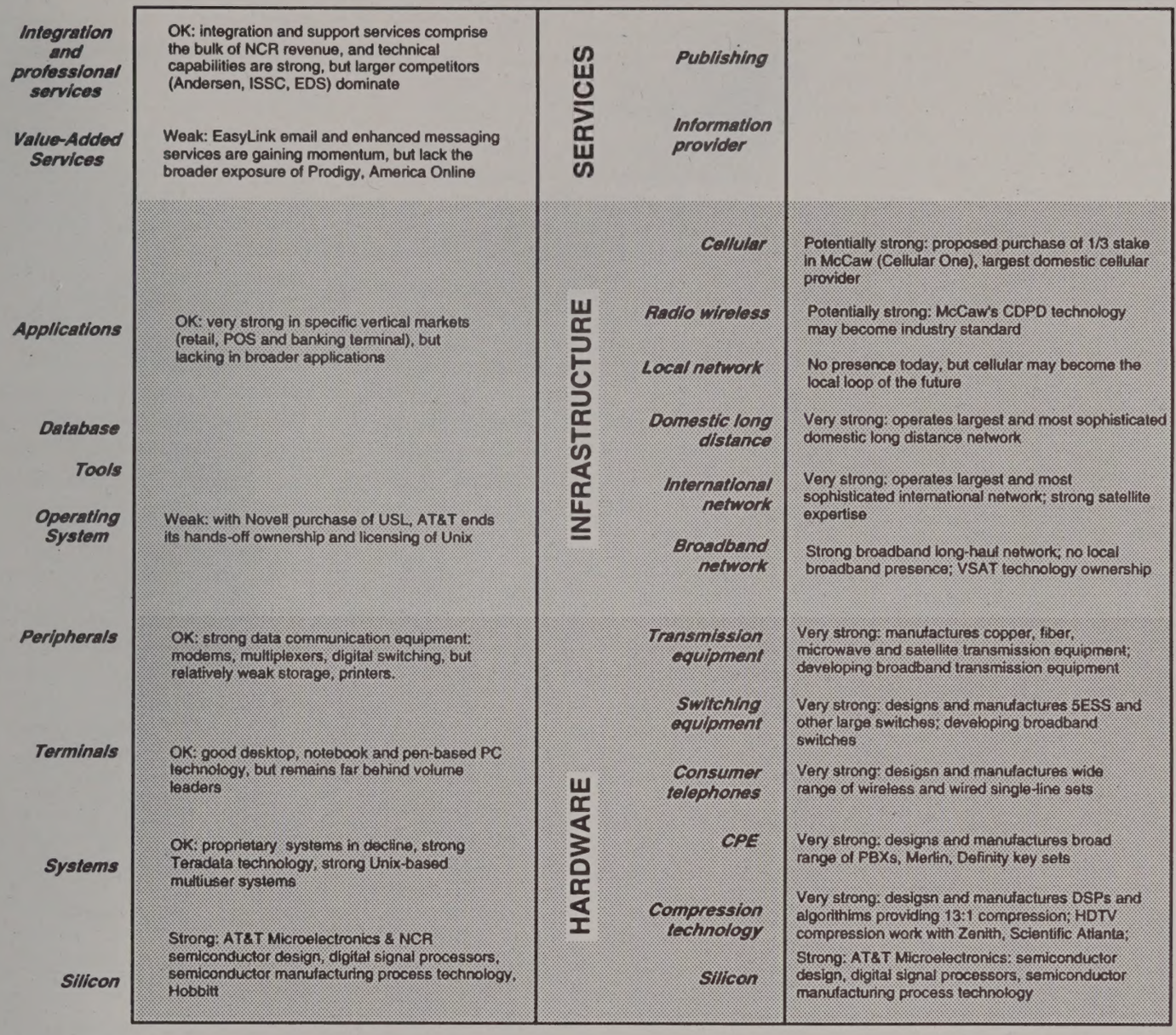
AT&T's Presence in Computer and Communication Industry Value Chains



AT&T. The downsizing of the past 10 years, coupled with aggressive and impressive diversification efforts have brightened the company's future.

In this issue of the *Gray Sheet* we examine the range of AT&T's broad and varied businesses. In some cases, AT&T is rebuilding the vertically-integrated blue chip of the past. Other efforts at integration through diversification have fizzled. Nonetheless, in stark contrast to IBM, AT&T's future course is largely set. Its fortunes rest on the performance of the broad range of independent business units described here.

The Elephant (1984) is Almost Dancing (1992)

Many people thought divestiture would be the best thing to happen to AT&T — often for the wrong reasons. It turns out that trading local carriage for the chance to enter the computer business wasn't nearly as simple as some figured, as the past eight years of toil and trouble demonstrate.

But divestiture did have a profound effect. Divestiture gave AT&T the shock it needed. In the eight years since divestiture, AT&T has undergone more fundamental change than many large organizations go through in 50 years.

If divestiture was the shock treatment, Robert Allen has been the recovery room doctor doling out long-term care. He has prescribed and administered an aggressive regimen of focusing on the problems at hand, giving business unit managers freedom to address specific problems in their markets, and shedding non-performers.

The result is that AT&T has decentralized from a rock-hard hierarchy into 20 lean and flexible business units. It has laid off over 100,000 employees. It has bought and sold companies at a dizzying pace.

What for? It seems like not much, at the bottom line anyway. Despite the epic changes, AT&T has neither increased its profitability upon its pre-divestiture days nor has it outperformed the various businesses and markets in which it competes, although revenue has begun to rise.

However, AT&T is now in the best shape of its post-divestiture days. Had AT&T not made such widespread changes, it would have been in deep trouble. Look at IBM. Leaner competitors would have eaten even more of AT&T's lunch.

So, what for? AT&T has been refashioned into a series of autonomous businesses that can identify market opportunity, efficiently employ corporate resources to build products to compete in them, and then win. To that end, AT&T's reorganization has been profound and successful.

Depicted below is an outline of the major businesses within AT&T, including 1991 group revenue.

COMMUNICATION SERVICES
Victor Pelson

Business Communications Services
markets long-distance services for businesses, including 800, WATS, ISDN, SDN, teleconferencing, Accunet, Skynet, VSAT services

Consumer Communications Services
manages domestic and international long-distance services, operator services, calling cards

Universal Card Services
markets and provides customer services for Universal Card

Easylink Services
markets range of enhanced services, including fax, e-mail and on-line computer information services

Personal Communications Services
develops and will market PCN services

NETWORK SYSTEMS
William Marx

Switching Systems
develops, manufactures and markets digital switches: 5ESS

Transmission Systems
develops, manufactures and markets cross-connect, digital multiplexer systems

Network Cable Systems
develops, manufactures and markets copper and fiber cable and apparatus

AT&T Microelectronics
develops, manufactures and markets electronic components and subsystems for other AT&T business units, OEMs, telephone companies

Operations Systems
develops, manufactures and markets network management hardware and software

Cellular Systems
develops, manufactures and markets software and hardware for wireless communications systems

Wireless Systems

COMMUNICATION PRODUCTS
Robert Kavner

AT&T Paradyne
data communications equipment: modems, multiplexers

Global Business Communications Systems
telecommunications equipment: Spirit, Merlin, PBX

Consumer Products

SUBSIDIARIES: NCR, ISTEL, Dataid, CAB, Infoplan, Others

OTHER

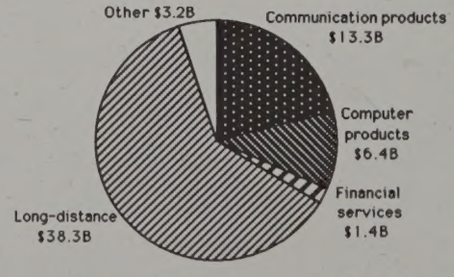
AT&T Ventures Corp.
provides leasing and financial services in both AT&T and non-AT&T equipment

AT&T Bell Labs

AT&T Capital

International Operations

Administrative and Corporate Functions



AT&T 1991 Revenue by Major Product Segment

AT&T's Core: Telecommunication Services See Slow, Steady Growth

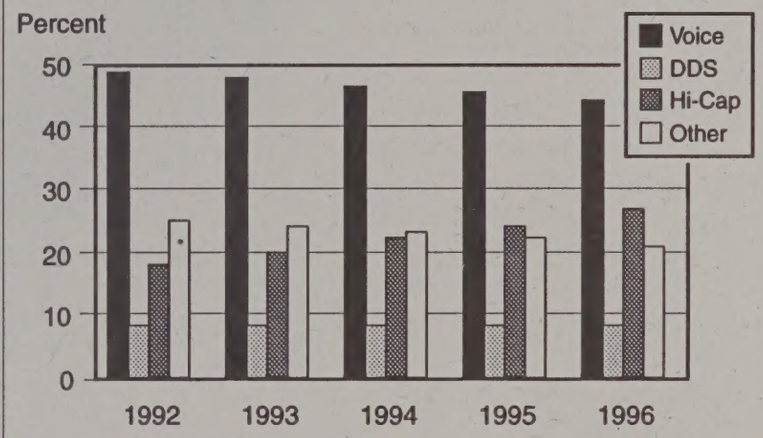
AT&T's telecommunications services businesses generated over $13 billion in gross margin in 1991, over half that of the entire company, on sales of almost $39 billion. Resources of that magnitude made potential competitors cringe when AT&T first eyed computer and information processing markets starting in the early 1960s. They can and have covered lots of mistakes and subsidized several successful new ventures for the company.

Carrier services are AT&T's bread and butter. They will continue to be. In the U.S., traffic is growing by about 6% annually while revenues are only growing at 3% annually. AT&T's market share is between 60% and 65% across all markets.

For the second quarter of 1992, the most recent reported, the company's call volume grew 6% and revenue grew 3%. Sprint's traffic increased 7%. MCI's grew 15%, over twice the industry average, largely on the success of the Friends and Family marketing campaign.

To counter MCI's success, AT&T spent about $2.7 billion on long-distance marketing in the third quarter of 1992. In addition, growth in 800 services and various WATS-like services contributed substantial gains, while residential and international calling also grew, only somewhat more slowly.

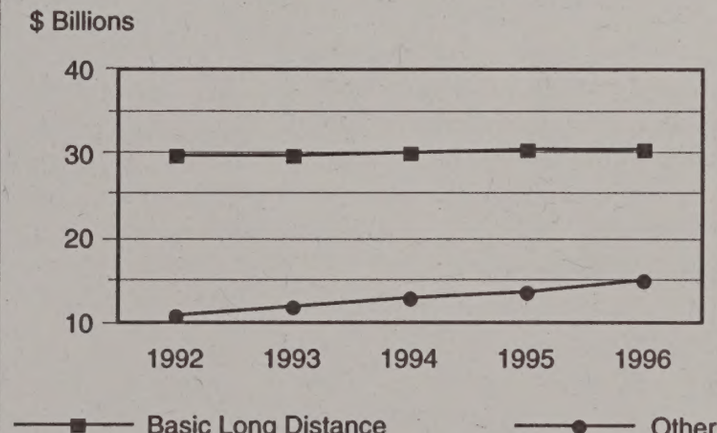
Interexchange Carriers' Private Line Revenues, 1992-1996



Almost all growth is derived from high-capacity service. Voice revenues are declining slowly. By 1996, high-capacity will comprise more than one-fourth of the entire private line market.

Source: FCC, IDC, 1992

Switched Voice Services Revenues of Interexchange Carriers, 1992-1996

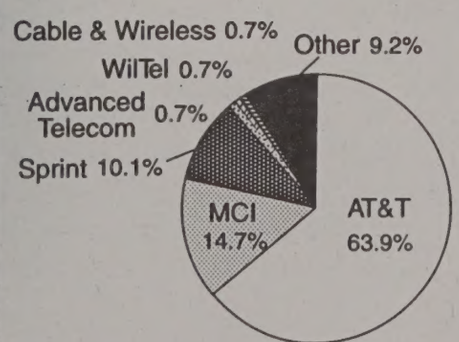


	CAGR '92-'96:
Basic Long Distance:	0.8%
OutWATS:	3.2%
InWATS:	9.7%
900 service:	8.5%
Virtual service:	16.7%
Other:	4.6%

NOTE: "Other" includes OutWATS, InWATS, 900 service, virtual service and all others.

Source: IDC, 1992

Total U.S. Market Share of Interexchange Carriers, 1991



Total 1991 Market: $53.6 billion

Source: IDC, 1992

Hobbit — AT&T Microelectronics' Most Visible New Product — Takes on Intel, ARM, Motorola, Microsoft

Comdex's back rooms last month were full of yet-to-be released sub-subnotebooks and rumored wireless handhelds/PDAs. Many PC companies have one, or will soon.

The majority of preannouncements are just further miniaturized versions of existing architectures, most notably low-power '386s and '486s. Suppliers of these products hope that by making them smaller, and by building new communications ability into them, they will become personal computers that communicate, driving a new phase of market growth.

No company has yet demonstrated, however, that the new devices will appeal to a broad class of consumers and business people. Some business applications will be popular. Whether they drive volumes that will lower prices to a range attractive to consumers is unknown.

AT&T is trying an end run around the Intel architecture. It is attempting to establish a new microprocessor/OS standard around which a whole new industry will coalesce. Consider the following:

- AT&T Microelectronics' candidate is a new RISC chip (Hobbit) running the PenPoint operating system from Go Corp.
- Hobbit was designed for applications demanding very high power ('486 or higher), and very low power consumption. The results: 13.5 VAX MIPS at 3.3 volts.
- AT&T is also shipping the low-power Cloud chipset providing support functions to Hobbit: parallel and serial interface circuitry, for example.
- NEC announced it will be a second source for Hobbit chips. AT&T has licensed Hobbit Technology to NEC (Japan's largest PC supplier) and Toshiba (Japan's largest portable PC supplier). Both promised to make Hobbit-based systems available in 1993.
- AT&T, in turn, is marketing EO's Personal Communicator 440, a 2.2 pound, 10.8"x7.1"x 0.9" device with 4MB RAM, a 640x480 non-backlit screen, V.32 modem and one Type 2.0 PCMCIA slot for $1,999. The price jumps to $2,499 when a cellular phone modem is included. The 440 is manufactured by Matsushita in Illinois. They will be sold in AT&T Phone Centers.

The PC industry landscape is littered with architectures that were unable to succeed in the shadow of Intel and Microsoft. Osborne, DEC's Rainbow, and TI's Professional come to mind. To succeed, the new standard needs, at least, volume sales to drive production costs down, application support to build demand, and access to distribution channels to reach potential buyers.

Which comes first? All of them. But volume is out of the question without application support. EO and AT&T can count on the following short list of software companies that are now writing to PenPoint on the Hobbit: Pensoft, PenMagic, Intuit, Slate, Ink Development, Notable Technologies, Sitka, aha!, Conic Systems Limited, Coactive Computing, and Wordperfect.

Reaching high unit volumes is a matter of phasing in appropriate sales channels. With EO, NEC, Toshiba and rumors of a major European sales partner, AT&T is on the way. It will initially focus on large accounts through its direct sales force and consumers through phone stores.

Interestingly, Hobbit-based products will be marketed from within the Consumer Products group at AT&T. Although NCR owns AT&T's PC, notebook and pen-computer (Safari) business, it is not involved in the EO Hobbit system OEM.

The Competition — Cracking the Cartel

Dozens of Intel PC companies are prototyping PC/communicators. Dauphin's new product is typical of many of the prototypes: a 486, DOS 5.0 and Windows for Pen system. Dauphin's happens to run a Cyrix chip. The sheer mass of the Intel/Microsoft PC industry makes it a formidable competitor. Nonetheless, it has weaknesses that AT&T and its allies may be able to exploit.

Intel is still allocating a large proportion of its R&D resources on maximizing raw performance. Intel appears to be focused on outperforming RISC chips. Making the X86 architecture more suitable for low-power and communications-intensive applications is a secondary consideration.

In light of Intel's decision to maximize performance and sacrifice low-power consumption, the Intel chips may be less than

(Continued next page)

Cellular: AT&T Rides McCaw Back Into the Local Service Business

A very pleasant deja vu? That's one way of describing how AT&T may regard its incipient purchase (pending FCC, not DOJ, approval) of a one-third stake in McCaw Cellular Communications. But this time may be even better than before.

The investment, which should be approved by the FCC within months, will put AT&T right back in competition with its progeny, the seven regional Bell operating companies (RBOCs) that deliver local telephone service to 90% of the United States. It goes a long way toward rebuilding the Bell system. And it gives AT&T instant market share in the fastest growing segment of the carrier services business. Consider the implications:

- Regional Bell companies bear the burden of regulation (state and federal), the crushing levels of investment required for fiber to the home or curb, and strong local loop competition (most notably MFS and Teleport). An AT&T wireless/cellular local loop threat is their worst nightmare.
- Equally as damaging and life threatening to the RBOCs is the bureaucratic executive management that publicly cries for freedom, but secretly (sometimes not so secretly) cherishes protectionist state regulatory policies that inhibit local exchange competition. The charge against RBOC management is a failure to rapidly or effectively invest in new equipment and higher-margin information services.
- AT&T local cellular may be just the beginning. A joint statement from the two companies claimed an alliance "would help the development of the first seamless wireless communication network nationwide."
- The investment may provide AT&T with a platform for introducing new digital wireless services. It can build on services McCaw has developed, like cellular digital packet data (CDPD). Combined with AT&T's EasyLink (enhanced fax, store and forward messaging, on-line services, and e-mail) the possibilities are astounding. Bundling EasyLink services to cellular customers may put AT&T one step closer to a universal mailbox. Charge it on your AT&T credit card and call it a Universal Mailbox.

AT&T's McCaw investment may be the missing link in the return of AT&T's vertical monopoly. The long-term importance of the investment hinges in one question: Will cellular ever become as inexpensive to use as the local wired loop for low bandwidth (voice) calls? If it does, AT&T is well on the way to restoring end-to-end service.

On the other hand, history has shown that innovative communications applications are always constrained by bandwidth. So, even if cellular siphons a large amount of voice traffic off the local loop, the RBOCs have the opportunity to leverage their local loop presence into new broadband services. In either scenario, AT&T stands to win.

(Continued from p. 6)

suitable for communicators. Even though companies like Cyrix might specialize in low-power X86s, the architecture may still be inappropriate.

Even IBM is developing a personal communicator-like product, It seems likely to employ an "8086-like" chip, but a final decision has not been made. The IBM prototypes also run DOS 5.0.

Other Upstarts Face Even Greater Barriers

Not all of the competition comes from the Intel/Microsoft community. Several other companies are also developing alternative architectures and products. Apple's personal digital assistant will be powered by the ARM 610 microprocessor. It is Hobbit's closest competitor. But Apple appears to be making a gamble of sorts. By relying, so far, on a smaller supplier like ARM, Apple may be somewhat vulnerable.

In addition, Apple appears to have vacillated somewhat on Newton's applications. Newton was positioned as a consumer device. More recently, Apple has indicated that the consumer market may develop more slowly than it thought. The current thrust is to develop business applications for Newton.

The change in marketing and evangelizing mirrors changes in the industry at large. Companies generally acknowledge that the consumer personal communicator market is still years away.

Apple's answer to EO is General Magic. Its hardware, while still at least months away from general availability, is likely to aimed at the same market. General Magic is said to be building an operating system optimized for communications.

AT&T Sells Unix Systems Labs to Novell

Last week's announcement that AT&T had agreed to sell all of its shares (approximately 60% of USL's outstanding) in Unix Systems Laboratories to Novell further demonstrates AT&T's resolve to focus on its core communication businesses.

For the past year, USL's revenues totalled approximately $80 million. Because of the heavy investment to continue developing new versions and enhancements, USL was probably never wildly profitable. More importantly, it no longer fit with AT&T's professed mission: businesses that move and manage information.

Unix Suppliers Rejoice

One rationale for AT&T beginning the process of divesting itself from USL in April 1991 was that the Unix market would be better served by a technology source that was independent. In such a scheme, an independent USL would be more responsive to the needs of its customers (systems and software suppliers) via a more equitable process of input to the technologies the company produced.

What Unix has needed was leadership. As the fractiousness in the Unix community worsened, the Unix story grew weaker. Unix longed for a company with a singular vision, with the technical ability to develop it (which is not as hard as the necessity of placating multiple Unix camps has made it seem), and the marketing savvy to communicate the message to the masses. In this light, Novell is the best possible news that second tier Unix suppliers could hope for.

Novell Steps In

Does Novell really want to go head to head with Microsoft? Apparently so. To enhance its product positioning, Novell will use the three key USL products: UnixWare (a high-end desktop, and more powerful server environment), Tuxedo (USL's transaction processing monitor), and System Management Framework (providing MIS with better control over Netware LANs).

With this in place, Novell could match wits with Microsoft with high-end desktop operating systems, workgroup computing environments, and can offer a choice for servers. The advantage Novell will have is plug compatibility with 53% of installed PC LANs — something Microsoft will lack due to its decision to not support Netware LANs directly with NT.

Over the long term, USL will enhance the positioning of Novell and Unix for both LAN environments and vis-a-vis Microsoft NT. The factors determining Novell's success with this acquisition will lie in the ability to retain the talent within USL, and in reducing the time to integrate new technologies into its future products.

AT&T Means American Telephone & Telegraph, But Maybe Not For Long

Just over three-quarters of AT&Ts 1991 revenue was derived in the United States. By contrast, most other multi-billion dollar multinationals achieve a much broader geographic revenue spread. As a result, the company has set its sight on improving its performance in international markets.

By the early part of the next decade AT&T hopes to generate one-half of its revenue from international operations. It's on the way. Since 1987, compound annual international revenue growth is 37%, when NCR is included.

AT&T has a three-pronged strategy for growing international business: acquisitions; joint ventures (more than 20 around the world, predominantly involving investments in national telecommunications companies and infrastructure); expansion of existing business (sales of 5ESS, PBXs and business communications systems)

Acquisitions

AT&T's three biggest acquisitions, NCR, Istel in the U.K., and Dataid in France, have already served to increase AT&T's international presence. NCR (see page 11) derives approximately 60% of its revenue outside the United States.

Istel supplies services, systems integration, and value added data services. It is particularly strong in the financial services and travel industries, and was purchased for $280 million in 1989.

Dataid, with 1991 revenue of $125 million, sells software and information services from offices in Paris, Belgium and Luxembourg. It was purchased in May, 1992, for $88 million.

Joint Ventures

Joint ventures are, by far, AT&T's most visible means of international expansion. To date, AT&T has invested in telecommunications networks on every continent.

Following are some examples of AT&T major joint ventures around the world:

Europe

- 19.5% stake in a Ukrainian long-distance and telecommunications network called Utel
- 62% stake in a sales and marketing firm — AT&T of St. Petersburg for selling telecommunications equipment
- Global R&D, production, purchasing, sales, and services alliance with Italtel

Asia

- Stake in Hutchinson AT&T Network Services to sell and provide sales support to EasyLink customers in Hong Kong, China, and Macao.
- Stake in AT&T JENS, providing enhanced network services in Japan
- 51% of AT&T Fitel with Furakawa Electric to manufacture fiber optic cable
- 50% of AT&T Shanghai, manufactures transmission equipment
- 50% of Goldstar Fiber, to manufacture fiber optic cable

Latin America

- 51% of Grupo Informatica Y Telecommunicaciones, supplier of voice, data and video equipment
- 5% stake in GTE-led consortium that has purchased a 40% stake in Venezuela's national phone company.

Expansion

AT&T is selling more of its line of products and services in international markets by expanding offices and relationships with local companies. Network Systems' 5ESS has been sold or is in service in 27 countries outside the United States. Consumer Products, Business Communication Systems, General Business Systems and AT&T Microelectronics are active internationally in sales of their products.

AT&T's Universal Card is Growing Fast and Is Already Profitable, But Where's the Synergy?

Warning signals go up whenever technology companies spend money on non-technology ventures. It usually means one of two things. Either they have relatively little confidence in the technology investments they have made, or they have so much cash they don't know what to do with it all.

The synergies between credit cards and telecommunications is tenuous. AT&T management saw enough of them, however, to invest in the AT&T Universal Card master charge. The apparent rationale: credit cards represent a growing business with some operational similarities to AT&T's core businesses of transaction processing.

To AT&T's credit, the Universal Card has been a success, with over a million new customers in only two years. Of course, when you're giving away cards, measuring success by counting subscribers is misleading. The business unit will be a true success when, and if, it steadily builds on the profits it has shown in the most recent quarter.

Cross marketing appears to be the sole synergy between AT&T's traditional lines of business and consumer credit cards. AT&T long-distance customers can buy products over the phone and use an AT&T card to pay for them. AT&T gets a usage fee for the long-distance circuit, and it gets a fee from the retailer for processing the non-cash payment. It can then creatively finance those purchases: bills are reduced by 10% of the amount of the AT&T long-distance bill. But such a transaction doesn't have anything to do with the credit card.

Is there any benefit to AT&T's owning both pieces? Probably not. Does Universal represent a vehicle for controlling and selling information content? Again, probably not. Those services or information products remain poorly defined at present. Greater synergies than cross marketing will be a long while coming.

Has the Universal Card Hurt AT&T?

Some problems remain. AT&T has lost a degree of credibility in the ultra-sensitive financial community. It has alienated a large block of financial services companies by introducing products that compete with its customers' products. Largely as a result of the Universal Card introduction, MCI has won several major new financial services network contracts.

In addition, with the Universal Card AT&T risks diverting itself from its core businesses. If growth rates start slowing, where does AT&T turn for help? What makes AT&T particularly well-suited for the commercial credit business? So far, the Universal Card business looks good. But these kinds of questions may plague it should business take a turn for the worse.

AT&T's Natural Progression Into Cable TV

While cable television companies scramble to raise rates before the recently passed legislation takes effect in 1993, AT&T is moving into the cable market as if it were completely free of potentially stifling regulation. Well, compared with long distance it almost is.

Cable television plays to AT&T's long-time strength: signal processing and transmission. AT&T, in fact, played an important role in the development of broadcasting in the United States.

It sold NBC its radio station interconnection business in 1930, which became NBC's second network (and was later sold to ABC). And AT&T first introduced the concept of commercial radio and television with the "radio tollbooth"— the arrangement that enabled well-heeled customers to rent the studio and transmitter to broadcast messages to anyone with a radio receiver.

Today, AT&T's cable TV initiatives are directed at two primary targets: developing digital compression and transmission schemes and systems for standard NTSC (National Television System Code) and high-definition television (HDTV) and other high-bandwidth signals. Its strategy hinges on developing partnerships with a range of potential resellers, customers and competitors. Among its cable TV development activities:

- Joint research with US West and TCI to develop digital compression for fiber and copper cable systems.
- Partnership with ComStream to develop products and services for satellite transmission of digital TV signals.
- Partnership News Datacom building upon smart card pay-per-view systems to develop means of controlling access to digital.
- Joint development with Zenith and Scientific Atlanta of HDTV digital compression technology.

Can AT&T successfully leap into cable? Very possibly. The timing is on its side because the cable TV business is undergoing almost as many changes as the computer industry.

For cable operators, the days of wild growth are over. Over 80% of American homes are now passed by cable. New growth has slowed almost to a standstill. Over 60% of American homes actually buy basic cable service. The name of the game for cable companies is no longer just signing up new subscribers but convincing basic subscribers to buy premium channels.

But it's not that simple. Five years of relative freedom has given cable operators solid profits, but they have managed to get consumers (high basic subscription rates, no alternative suppliers) mad. Not a good idea. As a result, the regulators are back.

Cable's response is to try to pack more services onto their current infrastructure. Many cable companies figure digital compression is the way to achieve higher transmission volumes of standard NTSC (be they premium or pay-per-view) to restore historical growth rates, and to keep potential competitors (read also: local telephone exchange carriers) away.

In addition, however, the rules of the game are changing. Consumers are inundated these days with speculation about the digital future: HDTV, video on demand, multimedia services, and other broadband applications. Such proposed services need bandwidth—lots of it. Most everyone expects that only some kind of optical fiber-based system will suffice.

Therein lies cable's second challenge. Cable systems are relatively old. Upgrading them will cost billions. But to stay competitive with microwave, multipoint-multichannel distribution systems (MMDS), direct broadcast satellite, and digital wireless services, cable companies must upgrade. AT&T will likely be aiming its digital compression and transmission gear at cable companies seeking to squeeze more throughput from its network.

AT&T will initially provide satellite program delivery to cable head ends from cable networks. That involves digital compression, satellite transmission, and access control elements at the uplink and downlink sites. Equipment will be available in 1993.

In addition, AT&T is also exploring the potential for partnerships at the cable plant portion of the system. The company has indicated it can boost transmission through existing technology by from 300 to 1,300 percent.

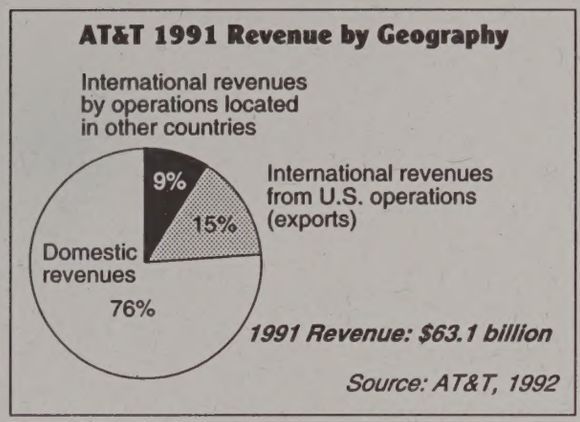
AT&T's NCR Unit Has Turned the Corner

Both AT&T's and NCR's computer businesses suffered seriously during the first year of the merger. But competitors are taking NCR much more seriously in 1992, during which the company achieved modest profitability. NCR's 1992 revenues will remain even with 1991 — at about $7.5 billion. Of that, proprietary systems — the I and V series — will decrease slightly, Unix hardware will rise a bit while revenue from PCs will decrease slightly.

Sales of computer hardware systems account for only a small part of the company's revenue. Much of NCR's value to AT&T lies in its vertical market expertise (POS, retail, ATM and banking equipment) and its profitable services and integration business. These businesses are expected to grow slightly in 1992.

Already the wholly owned unit has given AT&T what it wanted from the merger: profitability. To further exploit the alleged synergies between the two companies, AT&T needs to heed several key opportunities and weaknesses:

- Teradata performed well in 1992. NCR's 3600s (which use Teradata technology) started to move, ramping steeply in the fourth quarter. Of the 35 installed as of year end, 15 or 20 were sold this quarter. Most 3600s, about two in every three, are sold in Europe.
- But Teradata's technology may not be enough. Teradata's database is SQL but proprietary. Half of Teradata's shipments are sold without the backend (so that customers can run Oracle or Sybase). Does AT&T need big iron?
- The I series and V series are fading fast. But the good news is that customers of NCR's proprietary super minicomputer business are interested in migrating to Teradata technology. Major customer Sumitomo is rumored to be ready to buy a 3700, the next iteration of Teradata technology.
- NCR 3500s, SMP boxes, were a year late and are not aggressively priced. The 3500 8-way has good price/performance, in the lower half of IDC's medium-scale systems market. Because they were late, some of the pent-up demand might be mistaken for actual momentum.
- Good price/performance and scaleability at the low end 3400. The problem is that a company with NCR's size and overhead needs to sell more higher-ticket, higher-margin large systems. NCR's low-end systems focus may have hurt larger-systems sales.
- NCR sold over $900 million worth of PCs in 1991. In 1992, it maintained market share. While AT&T and NCR PCs are generally regarded as good products, they are caught in the flux between strong vertical market presence and the crush of direct sales.



AT&T had two major reasons for investing in NCR. First and foremost was to do something with AT&T Computer, which had been losing money for years. That process is largely complete: AT&T Computer's original 7,500 employees at the time of the merger have now been reduced to only 1,800.

The second reason was vertical integration. In the long run, AT&T would like to measure the success or failure of the merger by the degree to which NCR can increase its penetration into AT&T. AT&T likes to own the platform from which it delivers services. For computer services, that's NCR. In addition to solid profitability and growth, AT&T will expect NCR to provide hardware and software for an expanding range of computer-related AT&T services.

AT&T is Back

After eight years of inconsistent financial returns during a difficult and essential modernization, AT&T is on the verge of a remarkable comeback. The turnaround is the result of a similar strategy to that which built the original Bell system, starting in the 1870s: integrate horizontally and vertically whenever possible.

But AT&T seems to have learned an important lesson in the past eight years: just because the computer and telephone businesses *seem similar* doesn't mean competing in them *is similar*. The company is now focused on communicating information in the ubiquitously digital world. As a result, those words business people love — synergy and scale economy — ring loud as a bell.

AT&T at divestiture was the most awesome private enterprise in history. The Bell System controlled the design, sourcing, manufacturing, distribution, installation and maintenance of any equipment attached to its network. It's network carried voice, data and radio signals to every corner of this country, and to almost any corner of the globe.

A victim of its own success, AT&T grew far too big for its own good. So the Feds came to the rescue. Actually, when it happened AT&T wasn't too thrilled. In hindsight, it was the best thing that could've happened. AT&T was reduced to a manageable size, and competition returned in at least three market segments: manufacturing, and local and long-distance carriage.

Divestiture injected some much-needed innovation into the Bell System. It resulted in an astonishingly higher rate of development and deployment of new technology: thanks to the computer, communication today is absolutely different than ten years ago.

Today, computers and digital signals are the lingua franca of the publishing, broadcasting and communications industries. Not copper-cable based electrical current. Not mechanical switches. AT&T will again be a power thanks to the new digital communications world.

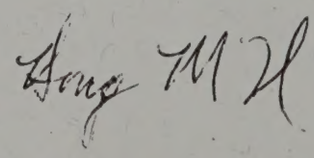
So AT&T has returned to its core business and found it not so bad at all. In going back to its roots, AT&T has taken the integration mandate to heart. The various new businesses in which AT&T is investing seem far flung. But they acknowledge both the company's past, and its future. Hobbit is AT&T's future smart terminal. EasyLink is AT&T's future electronic mailbox, answering machine, post office and ... maybe even corner store.

It gets better, too. AT&T has a significant advantage over local exchange carriers. The company recognizes that this country's muddled communication policy works in AT&T's favor. And, AT&T wants to make the blurry regulatory lines even blurrier.

In the communication industry value chain AT&T's only major deficiency is information content. Information (electronic publishing) seems like a natural upstream integration. It also happens to be an exceptionally profitable business (the Yellow Pages, for example). Surely AT&T is hoping that its earliest forays into electronic publishing — yet to be released services leveraging McCaw cellular technology, digital wireless, and personal communicator technology — will someday (probably years away) approximate Yellow Pages-like profit margins.

But AT&T seeks the regulatory catbird seat. It is a common carrier (with guaranteed rates of return). It acts like a broadcaster (selling bandwidth to paying customers). And it must, secretly maybe, want to be a publisher (with no information-provision restrictions whatsoever). All possible. All fair enough.

It may happen. AT&T is rather quietly constructing an awesome new infrastructure. Despite the prevailing anti-government tendencies of the American people, and aided by the perception (brilliantly cultivated by the company) that divestiture unfairly attacked AT&T, the government may end up as the only thing that can stop AT&T in the broadband, digital, wireless future. Yet, with the keen competition between regional telephone operators, cable TV companies and interexchange carriers, government intervention is completely unwarranted. Now that's a comeback.



THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | JANUARY 15, 1993 | VOL. 28, NO. 5 | Published continuously since 1964.

Stemming the Decline: IBM's Opportunities in Four Markets

Pretend for a minute that you run the biggest computer company in the world. On the heels of the company's worst-ever quarter *and* year, the board says "Fix it: focus on product strategy, find new revenue." What would you do if you ran IBM?

Aside from organizational changes to tame bureaucratic bloat, the company needs to continue to farm its legacy businesses, the troubled 370 line and still-strong AS/400. In this issue, however, we'll focus on long-term growth.

Any long-term strategy would probably address software, services, PCs, and open systems. Sharpening the company's long-term focus onto opportunities in those markets (in some combination) will play a large role in determining IBM's fortunes.

How great are the opportunities, and how well positioned in each is IBM? Consider the following:

- Worldwide sales of packaged software grew by almost 15% to approximately $56 billion in 1992. Unfortunately for IBM, its software revenues did not grow as quickly — only approximately 6% to $11.2 billion in 1992. As its software competitors grew faster, IBM's share of total packaged software spending declined to approximately 19% of the worldwide total. One strategy for regaining software momentum might be to better leverage the investments IBM has made in smaller software companies.
- Spending for IT-related services remains one of the largest and fastest-growing market segments worldwide. Services will again see worldwide growth approaching 16% in 1993. Contrary to some reports, outsourcing is not yesterday's fad. IBM is uniquely positioned to provide services. Doing so is, perhaps more than elsewhere, a matter of mobilizing organizational resources to address market opportunities.
- The 1992 PC-demand spike was driven by lower prices; as a result revenue was flat from 1991 to 1992 at approximately $67 billion. But $67 billion is a big number. The bad news for IBM is that its PC share has declined from one-quarter of the 1986 worldwide PC market to under 15% today. Ergo, the IBM PC Company and a new brand marketing fervor. Although IBM's manufacturing cost advantage

IN THIS ISSUE:

Unix Systems Market, 1992—1996 2

IBM Becoming Increasingly Competitive in Overall Desktop PC Price Wars 3

IBM RS/6000 Revenue by IDC Class Size 3

U.S. PC Market Share Leaders 4

Worldwide PC Market Share Leaders 4

Regional Proportion of Worldwide Packaged Software Revenue, 1992 5

IBM Software Revenue Is Growing, but Not as Fast as Overall Market 6

Services' Proportion of Total Worldwide IT Spending 7

IBM 's Changes from Within: Will They Be Enough? 8

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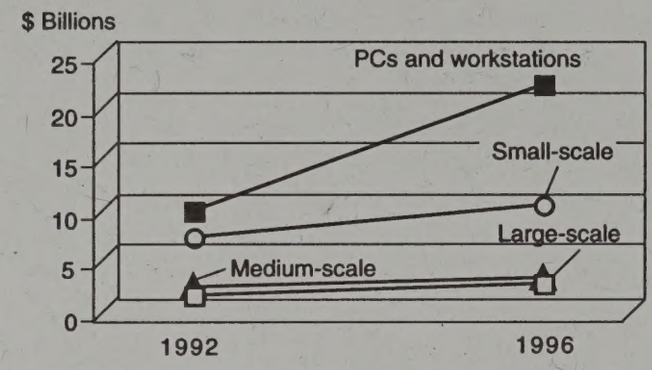
has all but disappeared, the company has several saving graces: customers will still pay as much as a 10% premium for the blue label. And, its selling, general and administrative expenses are kept unnaturally low thanks to the largesse of IBM corporate. So far, in a rush to jumpstart the PC Co., it is not paying its share of corporate overhead. That's a situation that will probably not last long.

Unix Systems Market, 1992-1996



Almost all of the growth in the worldwide Unix systems will come from single-user systems markets. *Source: IDC, 1992*

- Despite furious price competition, Unix-based systems continued to outgrow non-Unix hardware in 1992. The worldwide Unix systems market totaled $21 billion in 1992. IBM plays significantly in the two largest Unix segments: workstations and small-scale systems. IBM's RS/6000 workstation/server business grew approximately 42% to $1.02 billion in 1992, while multiuser RS/6000 systems grew by approximately 51% to $1.06 billion.

At least one theme is apparent in this analysis. In each of the market opportunities mentioned above, IBM possesses an undeniable degree of expertise.

IBM's distinctive talents include ownership of leading-edge technologies, manufacturing efficiency, and proximity to/understanding of customers. It certainly does not enjoy every advantage in each of the markets. But in almost every segment, IBM is a tough competitor because of one or two distinctive capabilities.

Thus, while it does not necessarily always have the best technology or the best marketing position, IBM often can deliver a level of value to its customers that its competitors cannot. Theoretically, IBM should be moving ahead of the market in at least some of these high-growth/high-opportunity segments.

To date, however, the weight of a $60 billion organization has been stifling. Those talents have been held back. IBM has not been completely able to unleash its most effective smaller units. In this issue of *The Gray Sheet*, we examine IBM's opportunities in each of these segments.

Unix Systems

For a company that Unix and open systems aficionados love to bash, IBM is doing pretty darn well in Unix systems. Its RS/6000 is succeeding by playing by the rules of the Unix market, not by the old-fashioned, heavy-handed account control.

The Unix systems market displays many different characteristics because it is not simply one market but a combination. The market dynamics of Unix PCs configured by VARs as small business multiuser systems contrast dramatically with those of the workstation market, and supercomputers as yet have little in common with database engines.

Yet all of these segments draw on some of the benefits of standards-based systems, chiefly software availability, system interoperability, and superior performance for the price. What *can* a hardware company do to succeed? Capitalize on the use of standard components wherever possible and leverage internally developed technology across multiple markets.

IBM is doing a good job of building RS/6000s out of commodity components. Unlike some Unix competitors (Digital, for example, which builds Intel,

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MIPS, VAX and Alpha systems), IBM has only one architecture across its Unix line in both technical and commercial markets. That it does is not rare, just somewhat surprising coming from a company with three commercial systems architectures (MVS, OS/400, OS/2) and three PC hardware architectures.

In addition, IBM's Unix operations are very standards driven. One example: HP is examining a licensing deal with Next; IBM rejected Nextstep largely because it is unique and not a standard. IBM's AIX is at least as standard as anyone's.

Finally, IBM is using its investment in Unix systems to increase the functionality of other systems. It uses Unix systems as a testbed for technologies that will eventually go into other products. DCE, which came from the OSF, will eventually appear in OS/400 and OS/2. Large 4Mb memory chips that appeared earliest in the RS/6000 will soon be in large systems. Future AS/400 I/O chips will draw heavily on IBM's RISC experience.

On the down side, IBM has missed at least one Unix opportunity. AIX on Intel proved to be a failure. IBM missed the opportunity to leverage AIX to other platforms.

Key challenges:

•Focus on RS/6000 sales efforts, perhaps by adding dedicated sales staff.

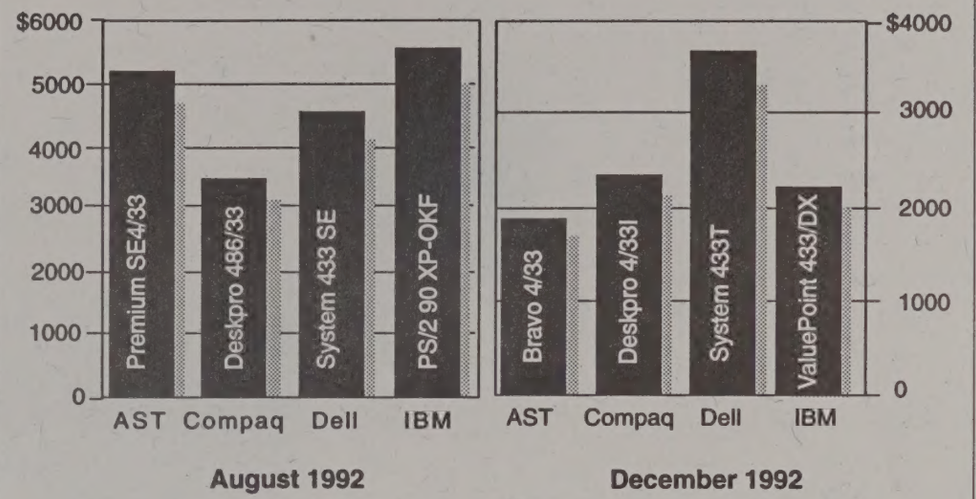
•Leverage low-margin Unix hardware sales with higher-margin systems integration deals.

•Continue to add IBM value and lock-in without violating industry standards (e.g., AIX, database, tools, etc.)

•Position its downsizing/distributed computing messages: AIX vs, OS/2 vs. NetWare.

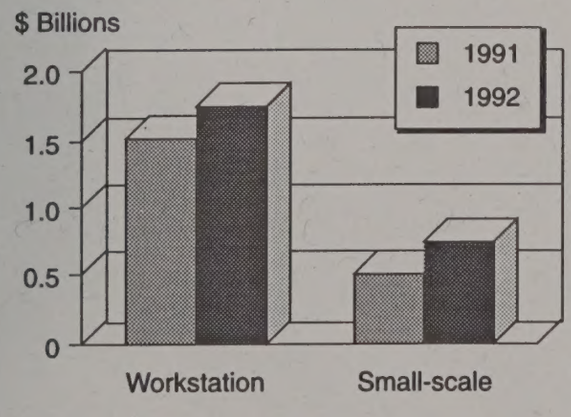
•Continue to position RS/6000 vs. AS/400 without damaging AS/400 business.

IBM Becoming Increasingly Competitive in Overall Desktop PC Price Wars



Source: AST, Compaq, Dell and IBM, 1993

IBM RS/6000 Revenue by IDC Size Class



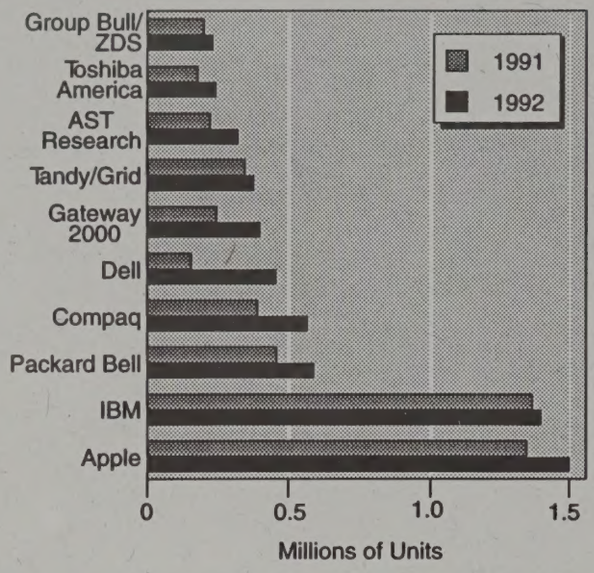
Source: IDC, 1992

PCs

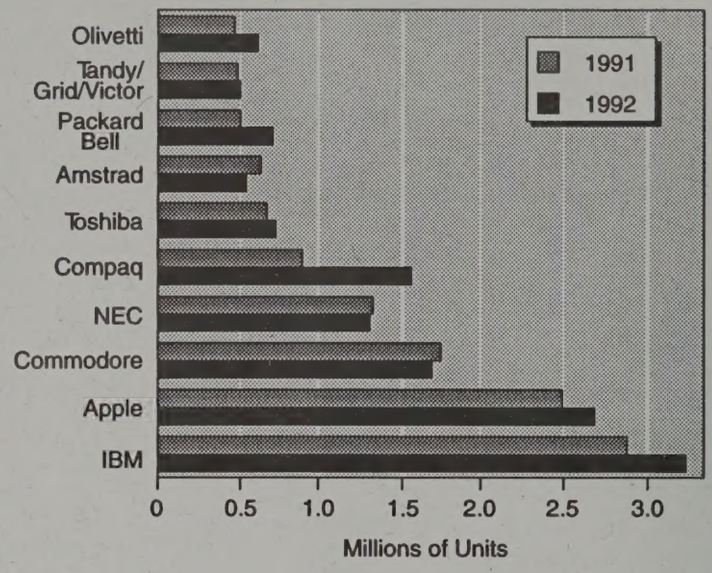
IBM's organizational changes in September moved responsibility for PCs away from the Personal Systems line of business into a separate entity, the IBM PC Company. It also ushered in a new strategy for PCs in 1993 and beyond at IBM. IBM's PC business now, as a result, will rely more on traditional brand management than on technological differentiation or leadership.

The net result is not two or three PC product lines, but four, five, or more. The PS/2 line became in 1992 IBM's full-service line. Systems are shipped complete with three-year, four-hour-response, on-site service. List prices range from $2,000 to $15,000.

U.S. PC Market Share Leaders



Worldwide PC Market Share Leaders



Note: Shipments include PCs but exclude single-userworkstations.
1992 shipments are preliminary estimates only.

Source: IDC, 1992

Price-conscious corporate buyers can choose the ValuePoint brand, available from IBM's new direct response center. ValuePoint has been an unqualified success for IBM. Largely as a result of its success, IBM shipped more PCs in 1992 than in any year in its history.

The PS/1 product line has splintered into several different lines for consumers. The PS/1s are sold through retail and mass merchandise stores. In addition, IBM has introduced a group to pioneer mobile computing products, such as the well-received ThinkPad.

The net result has been, so far, very positive. While few observers predicted the sudden price elasticity of PC demand in 1992, identifying the companies that benefited from it has been simpler: Compaq, Gateway, Dell ... and IBM. The ValuePoint introduction was introduced just in time to catch the fourth-quarter buying wave.

In the future, IBM's new brand-oriented strategy will require more fundamental changes beyond price cuts. IBM doesn't necessarily need to be a price leader, just price competitive. A 10% premium for the IBM logo is reasonable.

On the other hand, IBM will need to continue understanding its PC buyers better. Proximity to customers and an understanding of how to communicate the appropriate message to them are essential to brand management. Having shown previous inability to execute on a brand management strategy with the PCJr., IBM is not yet out of the woods in its second most important hardware market.

Key challenges

- Execute: Rid of the layers of management that tended to slow decision-making at IBM, the IBM PC Co. needs now to breed a new culture based on nine-month product life cycles and rapid technological obsolescence.
- Leave the brand managers alone: Brand marketing requires different skills and practices than IBM's old PC model. The new managers will need complete freedom to price, advertise, promote, and distribute as they see fit.
- Roll with the punches: Some aspects of brand-managing IBM's PC business will entail decidedly non-IBM traditional practices. To succeed in tomorrow's PC markets, IBM *needs* to be a completely new company.
- Manage brand and channel conflict: With a dozen different 386s flowing through a dozen channels, IBM stands a great chance of confusing the heck out of partners and customers. Sustaining an ordered chaos will be key.

Software

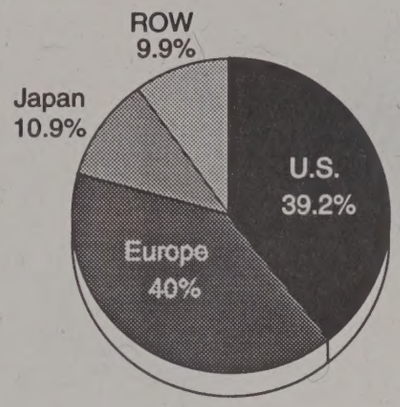
IBM sells more software than any other company in the world.

It chalked up approximately $10 billion in software revenue in 1992.

On its own, that has to be good news. But compared with the fastest-growing software companies, most notably Microsoft, IBM is losing ground. While Microsoft's total revenue for 1992 will amount to only a quarter of IBM's software revenue, it is growing over six times faster. Microsoft is on a $2 billion run rate, having just reported a $938 million calendar fourth quarter 1992.

Moreover, the lion's share of IBM's software revenue comes from slower-growth markets like mainframe and midrange operating systems and applications. In those markets, IBM's key initiatives of the last five years appear to have floundered. Products such as SAA and AD/Cycle are rapidly being retrofitted and retromarketed to address the needs of the PC-driven industry.

Regional Proportion of Worldwide Packaged Software Revenue, 1992



1992 Total: $56.3B

Source: IDC, 1992

SAA

SAA was IBM's grand vision for unifying applications across the entire range of IBM hardware in an organization. By enforcing compliance to SAA standards, though, IBM ended up not with a workable solution as it had envisioned, but with overhead. Overhead, that is, of both the financial and development-resource variety.

Today IBM's old view and vision for SAA is fading. In its place is emerging a new vision for SAA that emphasizes industry-standard compatibility. IBM will likely reengineer SAA to leverage its core strengths: transaction processing (TP) and a robust application environment.

IBM recognizes the importance of building infrastructure products. It is learning that proprietary attempts to do so are doomed. As a result, SAA is being transformed to provide an application infrastructure under the open-systems label. Its goal will likely be to give customers the ability to design applications with consistent, uniform APIs, regardless of the hardware platform — IBM or non-IBM.

If IBM can generate customer mindshare, it may realize significant payback. Few suppliers can call on 30 years of TP expertise. It has recently moved to offer open TP monitors, Encina and CICS/6000, on non-IBM platforms. These markets represent a major opportunity for IBM.

In addition, despite the client/server marketing noise endemic in the industry, few suppliers have experience selling production-level application development environments on low-end systems. Today's client/server architectures need to develop an industrial strength, bet-the-business mentality. Not simply printer- and file-sharing. As a result, IBM is as well positioned as anyone.

AD/Cycle

AD/Cycle, IBM's architecture for helping users develop applications more quickly, started out dominated by a mainframe bias and is now quickly becoming IBM's client/server application development platform for the future. But with two recent, major defections among AD/Cycle developers — Intersolv and Bachman — it has been dealt a blow.

The defections are probably just as well. Both Intersolv and Bachman had problems with the revamped AD/Cycle framework, albeit for different reasons. Intersolv objected to the new client/server workgroup direction AD/Cycle has taken. Bachman objected to IBM's insisting that AD/Cycle be Bachman's sole application development implementation.

IBM appears committed to the new framework despite the departures, and despite the fact that the LAN-based repository will not be available until 1994 at the earliest. In the meantime, IBM can only talk about AD/Cycle, not sell it.

IBM has indicated that it intends to continue to provide the information necessary to write to AD/Cycle to its former partners. It will also likely step up development efforts with developers of LAN-based repository products.

OS/2

Around the industry no other product is more representative of IBM's ills than OS/2. Just when IBM released a working version of OS/2 (2.0, after getting clob-

bered by Microsoft's technical staff), OS/2 got clobbered by Microsoft's marketing staff when Windows 3.0 was released. As a result, the general public perception is that OS/2 has been repositioned so many times that IBM must not know what to do with it.

In addition, OS/2 is now No. 3 on many important ISVs' port list, behind Windows and Mac. While OS/2 appears to be more robust than Windows, users appear to need more reasons to move from the Windows bandwagon. From a technology point of view, OS/2 is between Windows and NT, and it suffers from Microsoft's marketing at both ends.

According to IBM, OS/2 is the logical platform for customers who write their own applications that require a higher degree of security than Windows. At the same time, it is going head to head with Windows for office desktops. In many ways OS/2's mission seems more muddled than ever.

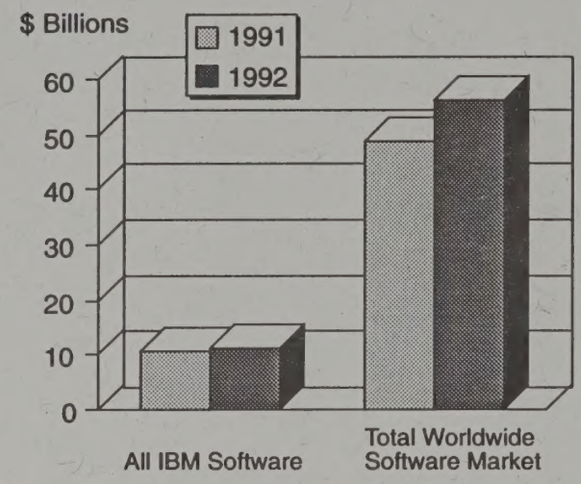
To capitalize on its advantages, IBM needs to move to a single-bullet approach from OS/2's current shotgun strategy. Things will only get worse for OS/2 when oft-delayed NT is released. It will be aimed more directly at custom developers than is Windows.

The idea that OS/2 will help PS/2s has lost steam. Its corollary, that PS/2s and ValuePoints bundled with OS/2 will generate momentum holds some water. But users still prefer the perceived safety of Windows. Newer versions of Windows (ie., NT) are coming soon. IBM will find that providing compatibility to them exceptionally difficult. And, as a result, IBM's best OS/2 marketing line ("better Windows than Windows...") will be rendered increasingly false.

Key challenges:

- Figure out whether OS/2 is a differentiator, or just expensive overhead.
- If its a differentiator, figure out whether OS/2 is a low-margin PS/2 loss leader, or high-margin add on.
- Appear more open: just as Digital renamed VMS OpenVMS, IBM is gradually shifting its software marketing messages.

IBM Software Revenue is Growing, But Not as Fast as Overall Market



Source: IDC, 1992

Services

In perhaps no area of IBM's businesses has change been more apparent and fundamental than the delivery of services in the United States. With companies like EDS and Arthur Andersen growing much faster than IBM, and smaller companies delivering more and more value-add through PC channels, it also represents one of IBM's most important opportunities.

IBM's basic service-delivery organization in the U.S. has been, for years, the Trading Area (TA). A cornerstone of IBM's reorganization involves making the TAs more effective. Today's trading areas have been imbued with a new freedom. Combined with P&L responsibility, the TAs have been changed into a much more effective organizational units resembling small, distinct integrators spread around the country. How? Three ways: organization, responsibility, and compensation.

Organization

The TAs have been flattened into much more effective organizations. As few as four layers of management separate field service engineers and the very top of the entire corporation.

In addition, the TAs can rely on a depth of resources within two related organizations—ISSC and the IBM Consulting Group. Previously, when an individual within an IBM trading area recognized an opportunity for systems integration, outsourcing or professional services business, the TA was obliged to enlist the help of ISSC. Now, the local manager has much more authority to make the decision to either call in ISSC, provide the services itself with the personnel from within the TA, or access local expertise on a case by case basis.

The organizational changes have built a healthy dose of competition into the TAs' day to day operation. Positive channel conflict keeps local personnel focused on customers' needs. Unless the TA is doing everything it can to help the customer, other organizations at IBM, as well as those outside the company, will step in.

Authority

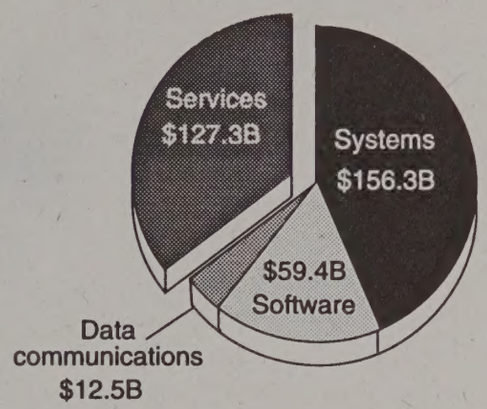
The mission of the TA has been refined and narrowed. Rather than acting as the sole distribution channel for the complete range of IBM products and services (with hefty revenue quotas for each), TAs are now free to do whatever necessary to build relations with customers. That means no revenue quotas, and no absolute requirements to sell specific equipment.

It also means that TAs very well may, eventually, have no particular allegiance to IBM hardware. In one case, IBM sold Citibank several dozen Sun workstations, when the Sparc architecture was a better fit with existing equipment. Such transactions serve to reinforce the TAs' charter: customers first.

Compensation

TA managers, and all employees of the regional TA offices with incentive-based compensation, are now paid according to the unit's overall profitability. Previously quota and percent of quota were the primary determinants of bonuses and commissions. As a result, each member of the TA team is more focused on profitability.

Services' Proportion of Total Worldwide IT Spending

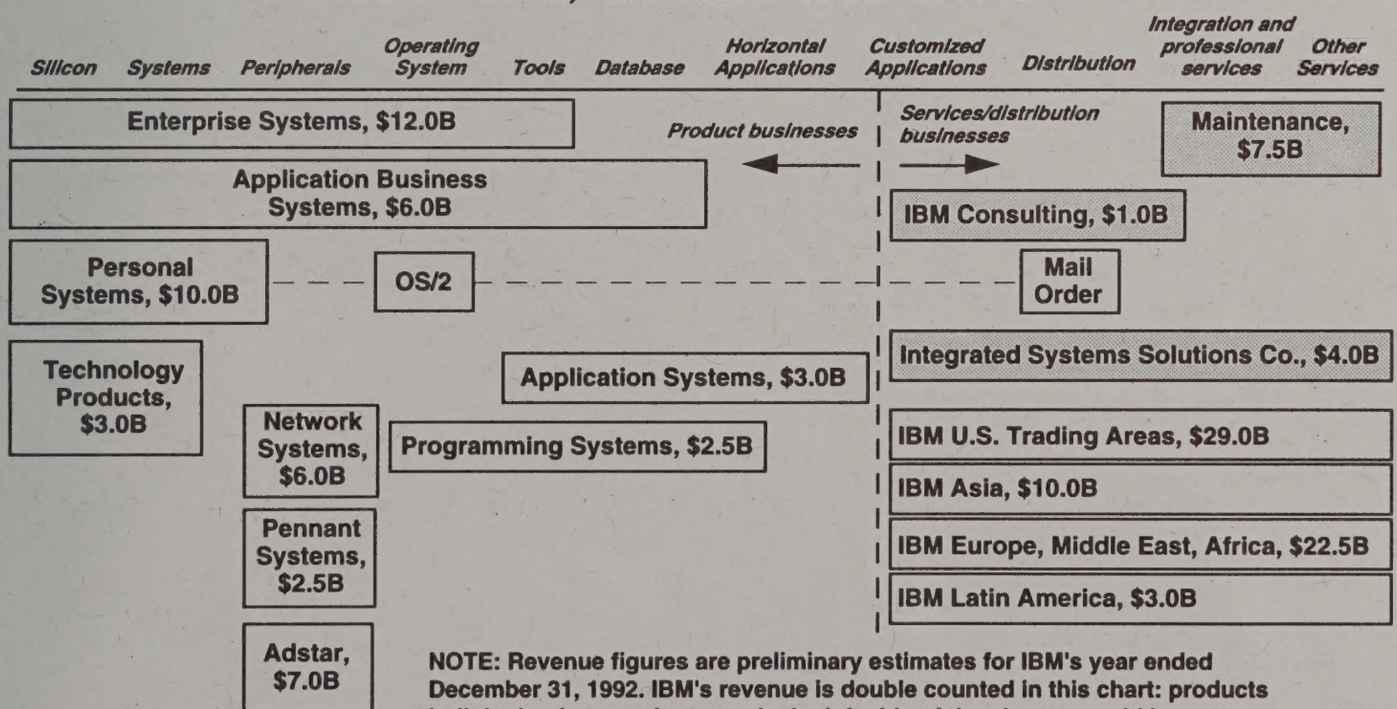


Source: IDC, 1993

Key challenges:

- Keep a lean focus: IBM needs to manage the new TAs without building in excess structures and policies.

Major IBM Business Units in the Computer Industry Value Chain, Estimated 1992 Revenue



NOTE: Revenue figures are preliminary estimates for IBM's year ended December 31, 1992. IBM's revenue is double counted in this chart: products built by business units towards the left side of the chart are sold by groups toward the right of the chart. The shaded portions on the right side of the chart represent services product revenue which is also funneled through the regional business units.

Source: IDC and IBM, 1993

IBM is Trying to Engineer Changes from Within: Will It Be Enough?

IBM has expended great effort recently talking about change. It has attempted to convince customers, stockholders and competitors that the company has been changed by recent events and is primed to thrive in the changed computer industry.

The job is only half done. In full-page advertisements in major newspapers the company endeavors to answer the question "what's really going on at IBM?" As IBM is poised to report a large fourth-quarter loss, many observers are worried that the answer to that question is either "more of the same."

No one doubts the pain of the company's downsizing. The double whammy of layoffs and severe market devaluation will suppress the overall mood of any company. At IBM right now, change absent of some short-term pain is not change enough.

As recognized on page one, IBM has made great progress in certain markets. The AS/400 and RS/6000 are winners. ValuePoint is at or ahead of plan. ISSC signed a major contract with McDonnell Douglas just last week, and announced a series of reinvigorating organizational moves. IBM is the world's largest software company, even if it does need to do more — much more.

But IBM is addressing one important question — the role of the company's top management in driving change — in a manner that hardly indicates it expects real change to occur.

None of the potential successors to Chairman John Akers — nor any of the top echelon of the company's management — have significant experience in an organization other than the old IBM.

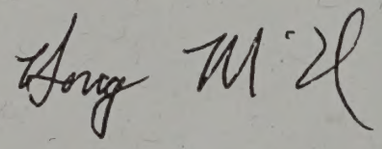
At a time when a fresh view of IBM businesses, its business environment and its customers is desperately needed, IBM seems to be circling the wagons. Recently IBM made a series of high-level personnel moves. It announced that two former executives, Paul Rizzo and Kaspar Cassani were rejoining the company. Several weeks later it announced that Bob LaBant and Ned Lautenbach had joined the company's management committee.

All of these men are highly intelligent, capable executives. They're also career IBMers. In fact, IBM rarely appoints executives from outside the company to top posts. Only three come to mind immediately: Steve Chen — an engineer building out-of-the-mainstream supercomputers for out-of-the-mainstream markets; James Bartlett — a champion of mobile computing at Phillips, NEC, and ZDS; and Bob Howell, formerly of Booz Allen, who runs IBM's centralized consulting group.

These and other executives bring IBM a needed change. Unfortunately, they are still far from IBM's top ranks. The management committee and operations committee are still dominated by executive with little computer industry experience beyond their time at IBM. The company could use more outsiders.

Look at some of Digital's recent moves. While Digital CEO Robert Palmer has not articulated a message or vision that seems as comprehensive and thorough as has IBM, he has brought in executives with outside experience. The new PC chief, Enrico Pesatori, brings an impressive list of credentials in the PC business. John Klein, a 25 year IBM veteran, was recently appointed to direct Digital's consumer and process manufacturing business unit. IBM might benefit from similar moves.

As far as successors to John Akers, IBM might also want to take a page out of Digital's book. Robert Palmer had only been at Digital for six years prior to his appointment. His vision — right or wrong — has at least slowed the losses at Digital.



THE GRAY SHEET
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1993 U.S. IT Spending Outlook: Sustained Slow, Steady Growth

The biggest IT story of 1992 occurred in the United States where the market for products and services grew a surprising 6%. For the first time in recent memory, the U.S. grew faster than Europe and Japan. Expectations for 1993 are already high.

A repeat performance may, however, be difficult. The industry is amid significant product-cycle transitions (Alpha and Pentium, not to mention NT). The double-dipped economy shows signs of improvement, but only rather weak signs. Planning under such conditions involves a significant amount of blind faith.

What exactly do U.S. IT managers and users forsee in 1993? According to IDC's 1993 Global IT Survey, the very top of large user organizations is characterized by an impressive confidence in IT and expectations to continue growing IT spending. The middle and lower levels of user organizations are somewhat less optimistic. Consider the following:

- Only 9% of CEOs indicate they expect 1993 IT budgets to decline. However, 15% of information systems (IS) managers and 42% of LAN managers and end users expect to see a decline in 1993.
- CEOs feel good about the overall impact IT has had on their organizations. Over three-quarters of CEOs feel IT has been a "significant source of competitive advantage" or a "steady contributor to the organization's ongoing operational capability."
- CEOs appear to be less concerned with cost cutting than either IS managers or LAN managers and end users. CEOs feel that IT's primary goal over the next 12 months should be to improve the organization's competitiveness. LAN managers and end users, however, have a different idea. They place an equal weight on focusing on obtaining more modern platforms and feel intense budgetary pressure that is not apparent among IS managers and CEOs.
- CEOs appear to be placing increasing influence, if not direct spending power, into the hands of IS managers. One-half of CEOs indicate that IS's influence is increasing in the overall organization.
- A majority of CEOs, however, ascribe only a "one of many influencers" role to their IS operations, as opposed to a position of being a "major influencer" in upcoming IT purchases.

IN THIS ISSUE:

MIS's Influence on IT Strategy: CEOs View 3

MIS Influence on IT Purchases 3

Three Views of Organizations' Most Important IT Goals 5

A Note on Methodology 6

Three Views of Organizations' 1993 Budget Expectations 7

CEOs and IS: They Are Communicating 8

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- In addition, IS managers do not recognize the limitations of their influence throughout the organization. Only 5% indicate that the group has no involvement in PC hardware purchases. Slightly more (6.7%) have no involvement with PC software purchases, and more again (10%) have no involvement with LAN purchases. LAN managers and end users indicate that far more of their purchases are made without consulting any central IS group.

In light of the transformations reshaping the industry, evaluating and quantifying demand for IT is an increasingly important component of IDC's research. To that end, IDC's 1993 Global IT Survey has polled key managers at three different levels of user organizations: LAN managers and end users, IS managers, and CEOs.

The benefits of this methodology are many. Overall IT perceptions and strategies vary widely across layers of user organizations. This methodology enables IDC to determine how perceptions and strategies may affect buying patterns. It allows us to isolate how IT responsibilities are shifting within different groups in the organization.

In addition, the three-tiered strategy allows us to examine the conflicts that develop between IT groups in user organizations. In some cases notable tension is apparent between upper, middle and lower levels of IT organizations. The schisms may be symptomatic of a widening generation and technology gap between CEOs and younger end users, or simply a statement of fact. In either case they contain meaningful data for IT suppliers that, almost necessarily, need to be all things to all people within their customer base.

Organizations' Most Important IT Function — View from the Top

All CEO/CFO respondents represented organizations with annual sales in excess of $400 million. According to them, improving the organization's competitiveness is an important goal for IS. Almost half of the CEOs surveyed (42%) cited it as the single most important area of focus for IS in the coming 12 months.

Understandably, CEOs' next most-important concern was another organizational issue. Approximately 26% of CEOs cited the need to focus on integrating central and end-user resources. Technical concerns were identified by only 18% of the CEOs. They identified the need to migrate their IS to more modern platforms as the most important area of focus.

Surprisingly (and heartenningly for IT suppliers), concerns over the cost of IS operations came up last in the survey of CEOs. Only 14% of them identified controlling costs as the single most important area of focus in the next 12 months.

These results bring into question the popular perception that CEOs are fed up with their MIS organizations. Their focus, rather, seems to scrutinize macro-level organizational issues. They seek to ensure that their IS groups are concentrating on furthering the organization's overall goals with a single cohesive strategy. How they do it (technically) and how much they spend doing it (controlling costs) are not primary concern to CEOs.

(Continued p. 4)

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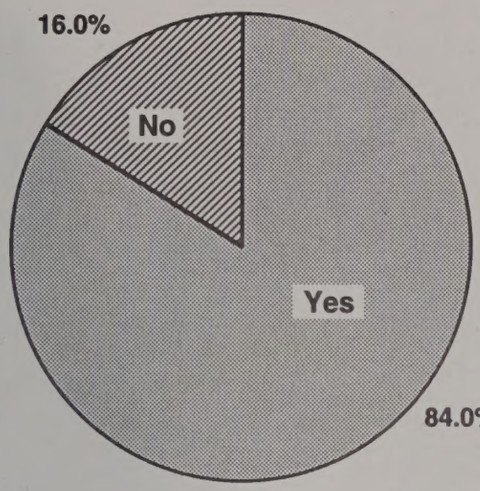
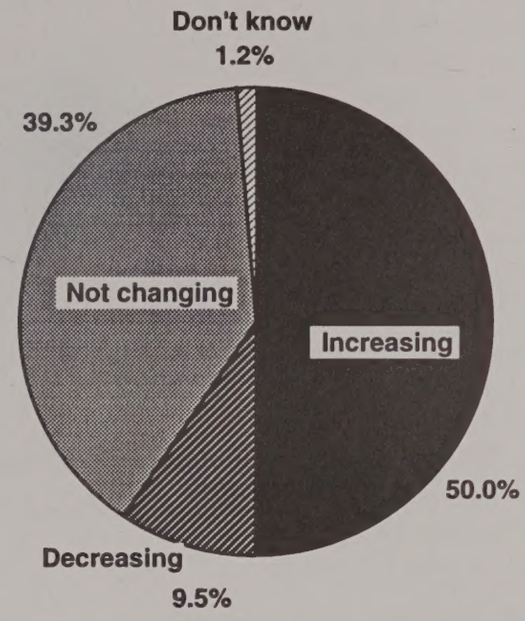
Not All IT Users Have MIS Groups



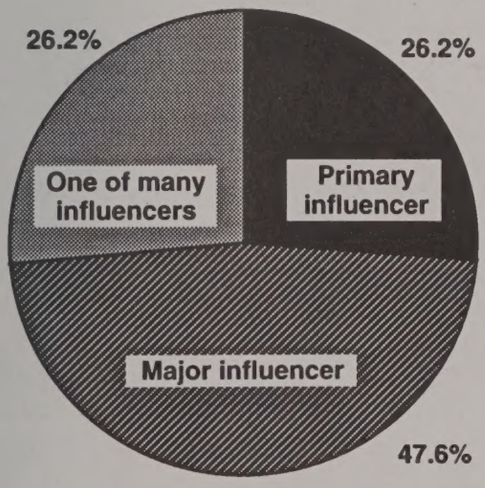
Responses of 100 CEOs to the question: "Does your organization have a centralized information systems management or MIS organization?" All respondents represented organizations with over $400 million in annual revenue.

How MIS's Influence Is Changing



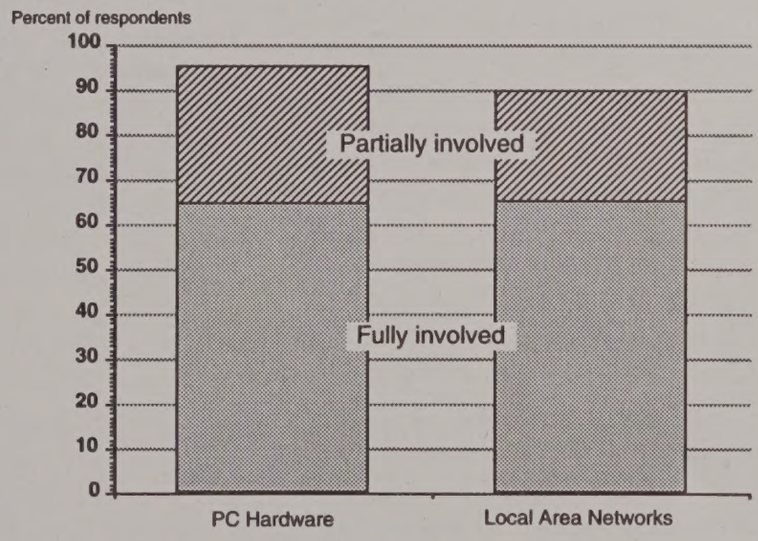
Responses of 100 CEOs to the question: "Is this MIS influence increasing, decreasing, or not changing?"

MIS's Influence in IT Strategy



Responses of 100 CEOs to the question: "How would you characterize the influence of this group in your company's overall IT strategy: is the MIS group the primary influencer, a major influencer, one of many influencers, or an insignificant influencer?"

IS Involvement in IT Purchases



Responses of 676 IS managers to the questions: "Is your centralized IS group involved fully, partially, or not at all in the purchase of [PC hardware and local area networks]?

Source: IDC's 1993 Global IT Survey

IS Managers: Slightly Less Confident than CEOs

When IS managers are asked the same kinds of questions, their technology biases become clear. Improving the organization's competitiveness was again the most important area of focus, but it was cited by only 35% of IS managers, as compared to 42% of CEOs.

IS managers are instead more concerned than their CEOs about upgrading to newer platforms. Over 28% of them indicated migrating to more modern platforms was their most important focus over the next 12 months.

In addition, MIS managers are much less concerned about integrating central and end-user resources than their CEOs are. Only 17% cited it as their most pressing concern.

LAN Managers and End Users: Not Much to Cheer About

LAN managers and end users, on the other hand, are more focused on technical and cost issues than either CEOs or IS managers. By way of contrast, only 28% of them identified improving the organization's competitiveness as the single most important area of focus in the next 12 months compared to 42% of CEOs and 35% of IS managers.

Instead, LAN managers and end users identify two other areas of focus with equal frequency: controlling costs and migrating to more modern platforms. In the fast-paced LAN and PC environment, users and managers seem more preoccupied with tactical issues than longer-term strategies. Just keeping up, within the constraints of tight budgets, seems to be of primary concern.

Not surprisingly, LAN managers and end users identify the need to integrate central and end-user resources far less often than CEOs and IS managers do. Often these groups are at odds with centralized resources. In addition, they often indicate that autonomy is a critical factor contributing to their effectiveness.

The Role of MIS in IT Purchases: the CEO View

To determine how influence over IT purchase decisions is spread throughout organizations, IDC posed a series of questions about IS involvement in IT buying.

Almost all of the CEOs and CFOs surveyed (84%) indicated that their organizations have centralized IS operations. But their perceptions of IS's contribution to overall IT strategy vary widely.

Only 22% of CEOs believe that central MIS group is a primary influencer of the organization's overall IT strategy. Forty percent characterize it as a major influencer, and another 22% as one of many influencers. Clearly, few CEOs simply hand the IT reigns over to their IS departments. Increasingly they expect IS to vie for influence within the organization, rather than simply by waiting to have it bestowed on them.

Still, IS seems to have a relatively secure position. According to the CEOs, less than 10% of the organizations with a central IS group indicate that the central group's influence is decreasing. Half, in fact, indicate that the central group's influence is increasing. CEOs seem to be focusing on giving IS departments enough room to succeed, and even fail, on their own.

CEOs feel that the central groups are actively involved in end-user computing products such as PCs and LANs. Three-quarters (68%) believe the group is fully involved in those purchases. The remainder are at least partially involved in PC and LAN purchases.

How IS Groups View Their Own Role

In general, IS managers have a slightly exaggerated sense of their role in setting and implementing IT strategy and purchases, compared to that of their CEOs.

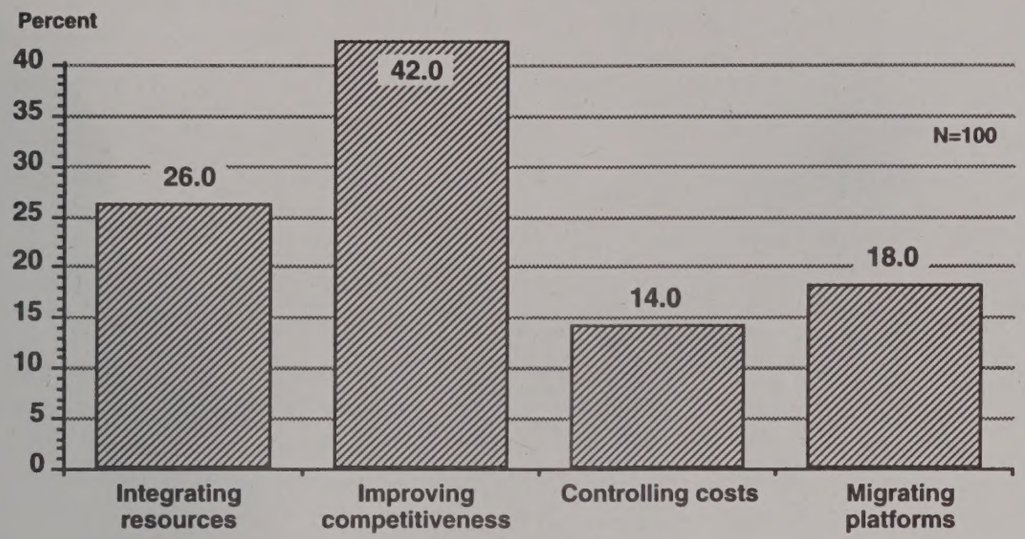
Slightly fewer IS managers than CEOs (78% compared to 84%) indicate that their organization has a centralized IS management group. The difference is probably representative of the differences in the polling base. CEO/CFO respondents came from larger companies (all in excess of $400 million in annual revenue) than other sampling groups, which came from a mixture of large and small organizations.

Of the 78%, two-thirds indicate that the group is fully involved in PC purchases and LAN purchases. Only 57% indicate the central group is fully involved with PC software purchases.

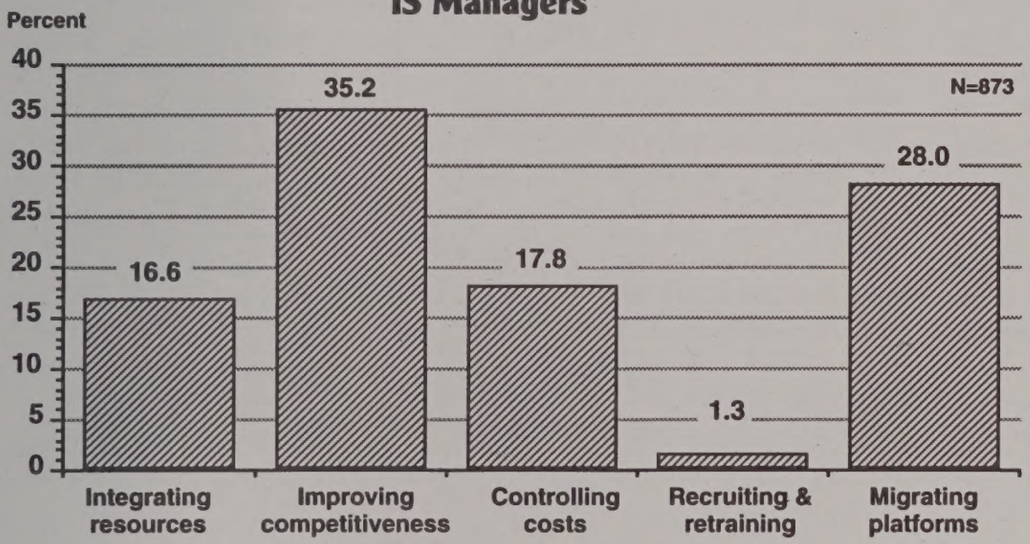
Of information systems managers from organizations with a central IS group, only 5% indicate that the group has no involvement in PC hardware purchases. Slightly more (6.7%) have no involvement with PC software purchases, and more again (10%)

(Continued p. 6)

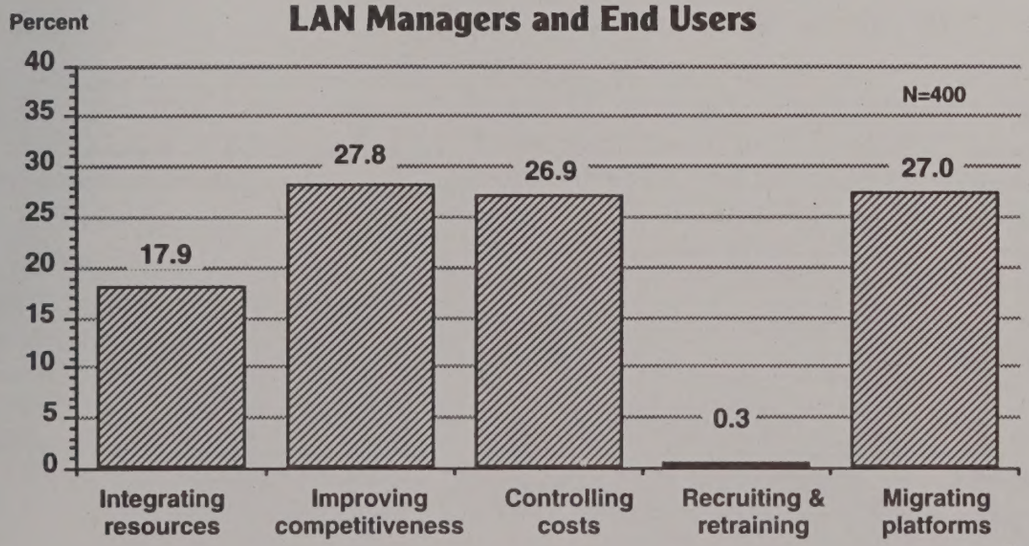
Three Views of Organizations' Most Important Goals in 1993: CEOs ...



IS Managers



LAN Managers and End Users



Responses to the question: "Which one of the following will be your site's most important area of IT focus over the next 12 months?"

Integrating: "Integrating central and end user resources into a single enterprise information system."

Increasing competitiveness: "Developing and/or implementing strategic applications to improve our organization's competitiveness."

Controlling costs: "Controlling costs and improving the financial justification for continued IS investment."

Recruiting and retraining: "Recruiting and retraining top quality computer professionals."

Migrating platforms: "Migration from older technologies to more modern hardware and/or software platforms.

NOTE: CEOs were not given the "recruiting and retraining" answer in an attempt to focus their responses on areas in which they exercise greater influence.

Source: IDC's 1993 Global IT Survey

have no involvement with LAN purchases.

The View from Below: LAN Managers and End Users

The difference between IS and CEO impressions seems even clearer when LAN managers' and end users' views are examined.

The two groups agree on the presence of a centralized IS organization. Approximately 78% of each indicate that their organizations have a centralized IS management group.

But of those, only 39% indicate that the central group is fully involved in PC purchases. Even fewer—34%— indicate it is fully involved in PC software purchases, while 49% acknowledge the central group is fully involved in LAN purchases.

These data seem to place the IS group view clearly at odds, both up and down the organization. IS departments' self-perception includes a slightly more significant role than the one their CEOs ascribe to them. And although two-thirds of IS departments think they are involved with PC hardware decision making, neither CEOs nor end users quite agree.

1992/1993 IT Budget Directions

To determine how different personnel throughout the organization perceive planned budget changes from 1992 to 1993, IDC posed a series of questions about planned purchases.

Some 50% of CEOs expect their 1993 IT budget to increase. Another 35% expect it to stay the same, and only 9% expect it to decrease.

MIS managers are a little less optimistic. Only 38% expect their 1993 IT budget to increase. Another 44% expect it to stay the same, and 15% expect it to decline.

LAN managers and end users are far less optimistic than both CEOs and MIS managers. Only 21% expect their 1993 IT budget to increase. Another 36% expect it to stay the same, while 42% expect it to decline.

A number of factors explain these differences in the data. Two seem most plausible. CEOs may be (perhaps unconsciously) unwilling to admit to an interviewer that their company's IT budget is not increasing. In this case, MIS managers and the LAN manager/end-user projections would be more accurate.

On the other hand, all three responses including their wide discrepancies may be valid if an increasing portion of spending were being consumed by external consulting/outsourcing, or if administration of IT systems and personnel were absorbing a larger portion of the IT budget. In either case, CEOs very well may be seeing their IS budgets increasing in 1993, IS managers may see flattened spending, and LAN managers might still be experiencing decreasing budgets.

A Note on Methodology

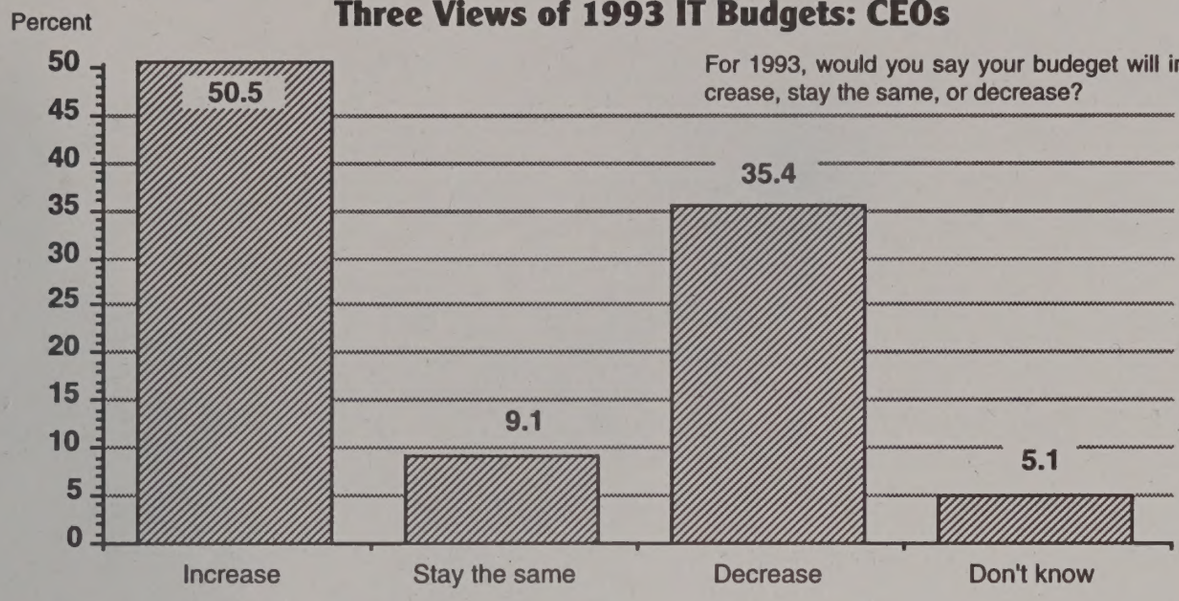
IDC's 1993 Global IT Survey was established to provide our clients with accurate information and IDC analysts with a reliable framework for market forecasting activities. These objectives are reflected in the sample design, questionnaire development, survey execution and data analysis of the project.

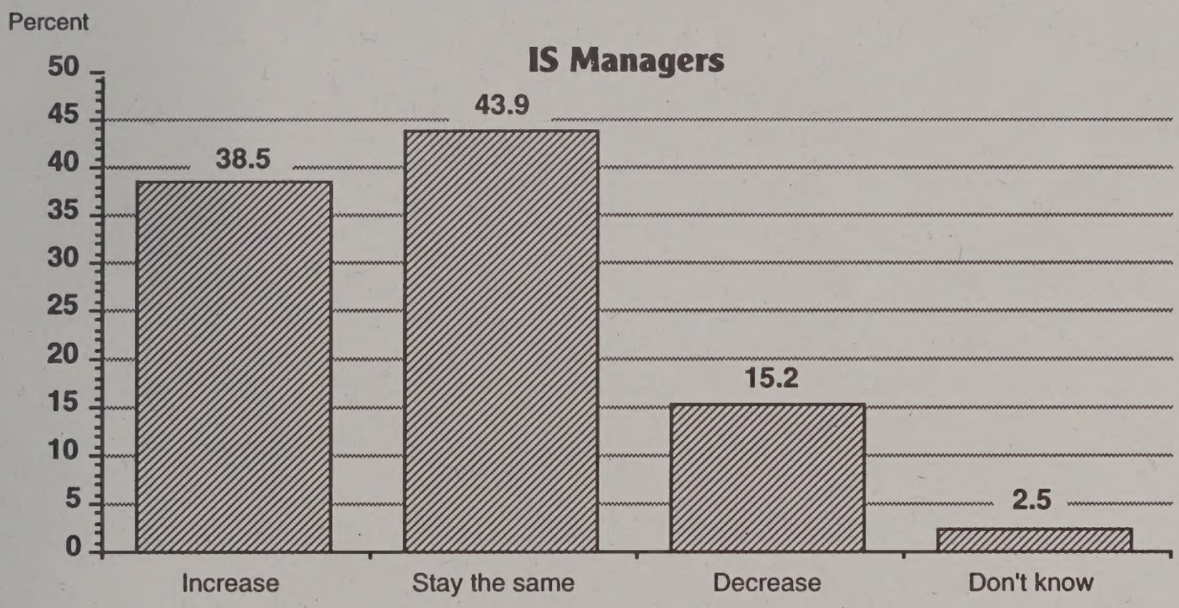
IDC selected the site as the sampling unit. A site is defined as a comprehensive information system environment at one physical location under a single budget control. Accurate site information is relatively easy to obtain, interpret, and verify. A site focus also reflects the industry's emphasis on site-based marketing strategies.

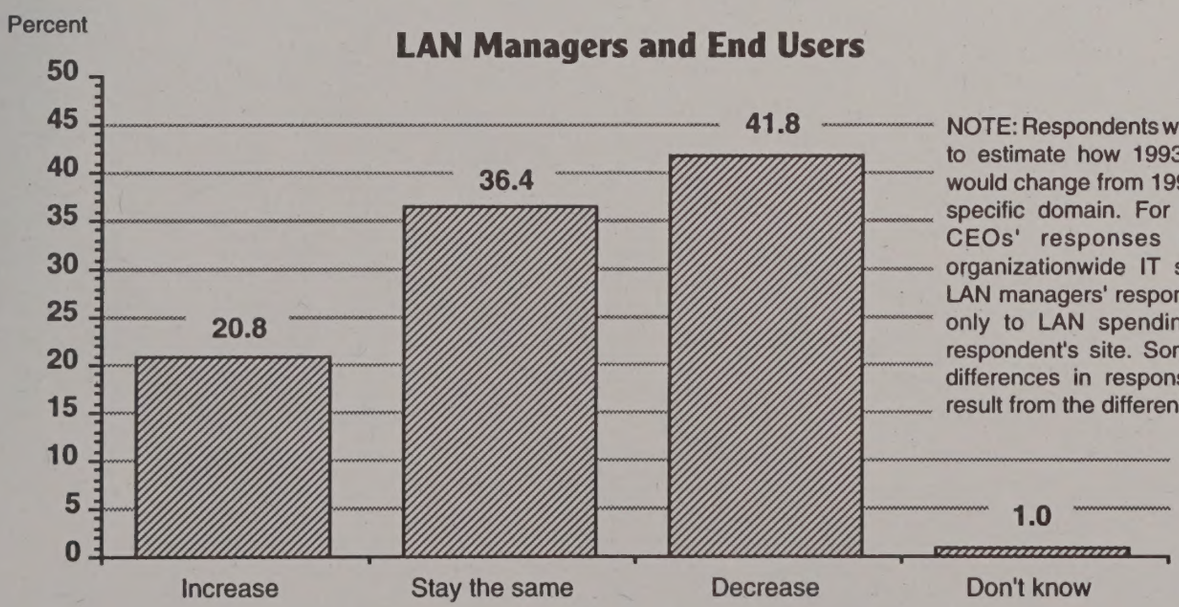
However, in order to get the most accurate projection of market opportunities, we have chosen a budget-weighting methodology for IS manager and LAN manager/end-user responses. By limiting CEO samples to organization with over $400 million in annual revnue, direct comparisons between the different samples are possible.

The survey was split into three distinct components: CEOs, IS managers, and LAN managers and end users. In the U.S. component of the survey, we interviewed 100 CEOs, 873 IS executives and managers, and 400 LAN managers and end users.

Three Views of 1993 IT Budgets: CEOs







NOTE: Respondents were asked to estimate how 1993 budgets would change from 1992 in their specific domain. For example, CEOs' responses refer to organizationwide IT spending. LAN managers' responses refer only to LAN spending at the respondent's site. Some of the differences in responses likely result from the different focus.

Source: IDC's 1993 Global IT Survey

CEOs and IS Managers: They Are Communicating

What do CEOs really think about and how much do they really know about computers, information systems and new technology? Do their subordinates agree with them? Just how different are the plans of CEOs' and IS managers?

These are just some of the questions IDC has attempted to address in its most recent user survey. In addition to quantifying specific buying intentions and strategies, we have also attempted to shed some light on perceptions of and attitudes about IT throughout user organizations.

The goal of such research is to develop a better understanding of the relationships and responsibilities of different management/personnel layers involved in the IT decision-making process. To that end, some of the influx of data from IDC's Global 1993 IT Survey can be used to prove or refute industry stereotypes.

For example, we can examine the belief held by some that CEOs really don't know what they're talking about when it comes to IT. And that if they do not understand information technology and how it can drive their business, they're trying to run IS out of town and keep their employees and resources focused on adding value by other means.

Or, we can examine whether IS managers really are clinging to fiefdoms and seeking to protect their shrinking domains. And that if they aren't clingers, they're aggressive downsizers.

Contrary to some views, CEOs have a high degree of familiarity with IT topics and trends. When asked whether they were familiar with seven IT terms (ranging from business process redesign to a variety of kinds of outsourcing), scores ranged from a low of 62% to a high of 92%.

CEOs were most familiar with the term downsizing; 92% of them understood what it means. In addition, CEOs were very familiar with the terms data-center outsourcing and software-development outsourcing.

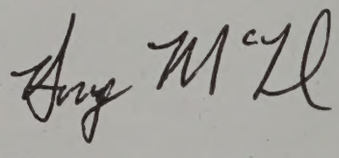
A high degree of familiarity with these terms, however, does not indicate a predisposition to act. Only half of the CEOs indicated their organization was pursuing or considering a downsizing option. Only one-third of the CEOs indicated their organization was pursuing or considering data-center outsourcing.

Surprisingly, two of the most talked-about trends in the IT business — open systems and business process redesign — were the least familiar to CEOs. Only 62% of them were familiar with business process redesign. Only 64% were familiar with open systems.

Despite the low overall familiarity with the term, 58% of the CEOs indicated their organization was pursuing or considering an open-systems strategy. And 64% of them are pursuing or considering software-development outsourcing.

How does this data compare with what IS managers foresee? In general quite well. Their spending plans dovetail very cleanly into CEOs' projections for business-process redesign, software-development outsourcing, data-center outsourcing, and commitment to open systems strategy.

Coincidence? Not likely. Apparently CEOs and IS managers do indeed hold similar views about how best to deploy IT in their organizations. That's good news for everyone in the business.



THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | FEBRUARY 12, 1993 | VOL. 28, NO. 7 | Published continuously since 1964.

The Branding of the PC Business

One symptom of PC industry maturation is the growing importance of brand marketing. After a five-year hiatus, strong brand identities are again a significant competitive advantage for PC suppliers.

It is not a new strategy. Apple and IBM legitimized the PC business by marketing brand image. Then clone makers shifted the focus onto technology: compatibility, speeds and feeds, low cost. With plug-and-play compatibility, alternate channels became the primary source of differentiation. Brand managing took a few years off until, well, until last summer's price wars began to separate the players from the posers.

The brand leaders are again winning the PC share game: AST, Compaq, Dell, Apple, and, barely holding on, IBM. How are the branding leaders leading? With price leadership, place ubiquity, and promotional clarity.

The Gray Sheet *recently attended Goldman, Sachs & Co.'s 7th Annual Technology Investment Symposium in New York. In this issue we examine several of the presentations. The comments here are a combination of company-provided data and IDC analysis, and do not solely represent the views of the presenting companies.*

IN THIS ISSUE:

PC Branding Report:
AST Research 1
Compaq Computer 2
Dell Computer 2
IBM PC Company 3
PC Price War: Over or Not? 3

Other Profiles:
Intel Corp. 4
Digital Equipment Corp. 5
Computer Sciences Corp. 6
Legent Corporation 6
Borland 7

Complexity, Maturity, and Secular Decline: "It's the Business Model, Stupid." 8

AST Research: Only Slight Changes to Successful Model

AST Research has a fairly simple strategy: identify market sweet spots, tightly manage efficient manufacturing plants, and lean on VARs and mass merchants to sell hot products. It has done all three with proficiency, making it well positioned to survive price wars and driving 65% unit growth over the past year.

While Compaq and Dell are now contemplating carefully adjusting their business mixes to grow, AST seems to be redoubling its efforts at making this plan work. The company expects to make no major changes in the coming year.

That said, regularly identifying the hot market segments and then executing on very tight manufacturing deadlines is one tough job.

AST does have several other longer-term challenges. Its loyal channel partners are under siege by Compaq and IBM. AST may need to further cut margins to retain dealers or broaden its overall distribution strategy.

And, of the major brands, AST's Premium and Bravo are probably the least recognized. As superstores and mass merchandisers carry broader and broader selections, brand names become a more important

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differentiator. AST's marketing efforts will need a boost to better position the company's brand image.

AST representative: Safi Quereshey, CEO

Compaq: PC Industry's New Brand Marketing Leader

Compaq could afford to fire the opening salvo in the Great 1992 Price War by cutting the overhead cost of every manufactured unit by 63% in 1992. If you're starting a price war, you'd better have ammo. Compaq has ammo.

Compaq grabbed price leadership from a host of second- and third-tier suppliers. According to Compaq's top management, the company has every intention of retaining price leadership in 1993. If it does, the company has every chance to match its industry brand-name leadership with unit volume leadership within 18 months. Compaq is poised to take the top spot from IBM, almost regardless of IBM's ability to rebuild the PC Company.

Company management feels that aggressive pricing will continue in 1993. The industry will standardize around the '486 running Windows at an accelerated rate than previous generation transitions. As a result, worldwide unit growth will average 15% — slightly higher in the United States, lower in Europe.

Compaq expects to increase its share of the 1993 market by tightening its focus on market segments: large, medium, and small business PC buyers. It is continuing expansion into Latin America, begun two years ago. It intends to broaden its Compaq Care around-the-clock warranty service.

In addition, Compaq expects to further expand its dealer base. In 1992 it added 4,000 dealers, growing from 4,600 to 10,600. In 1993 it expects to add another 3,000. These will be retail and consumer channels in the U.S., and VARs outside of the United States.

Compaq management cited the following key factors that differentiate it from major competitors:

- Compaq's worldwide logistics and manufacturing capability is seen as a major advantage. Management indicated that by controlling all aspects of sourcing and manufacturing, Compaq can realize significant tariff and freight/duty advantages.
- Compaq's designers were awarded 27 patents in 1992; an additional 114 were filed and are awaiting action.
- Compaq's channel blanketing strategy ensures that it at least reaches almost every potential PC buyer. The company feels that PC companies that do not use all channels are not addressing the total market.

— Compaq representative: Eckhard Pfeiffer, CEO

Dell Computer: Setting a Target for Industry Leaders

Despite a highly publicized controversy about currency hedging practices and recent drop in investor confidence, Dell Computer continues to show signs of winning new customers and gaining market share. Over the past year revenue grew by almost 150%. Growth in large account business grew 176%. How? Execution, execution, execution.

The company's objective is "to deliver a new model for delivering and integrating solutions — the electronic superstore" by focusing on several key sustainable advantages:

- Brand value: Dell is known as the direct company. Customers with any intention of shopping direct will almost invariably shop Dell, management believes. In addition, Dell products have won the respect of customers and analysts for quality, durability, and functionality.
- Customer relationships, customer database: very few of Dell's competitors know as much about their customers as Dell does. In terms of sheer quantity, Dell can deliver personalized promotions to a larger audience than any competitor other than, perhaps, gateway.
- Low-cost distribution model: Dell management contends that by eliminating one step

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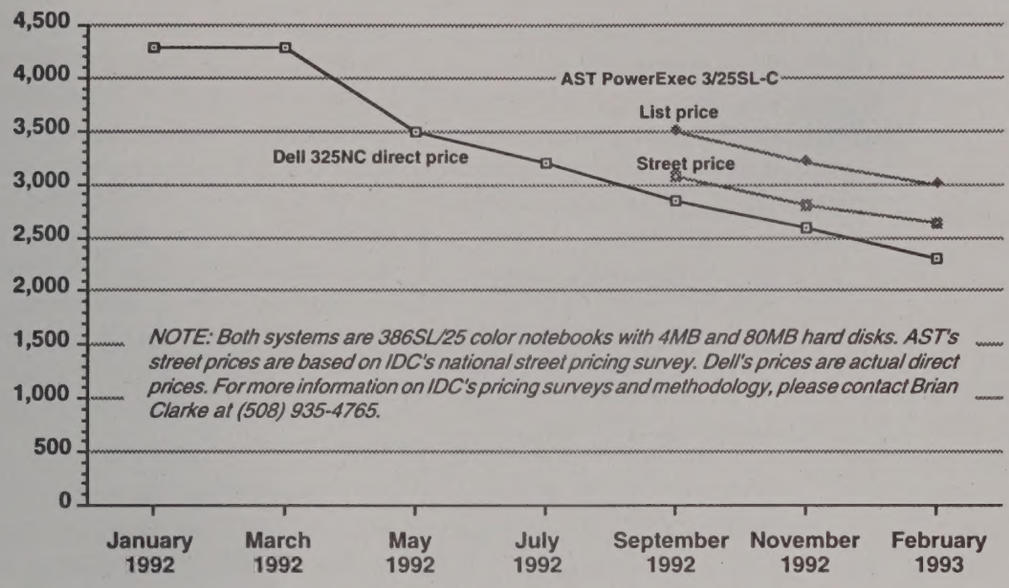
Dropping PC Prices: Color Notebook Case Study



Are PC price wars drawing to a close? On the heels of another 'cross-the-bow pricing action (Dell), and another round of return fire (Compaq and AST), it might appear that the PC price pressures that drove units through the second half of last year might not be abating after all. Not true. The most recent actions were, more likely, a correction of unnaturally high peripheral prices at Dell.

IDC expects pricing declines to moderate during 1993. The average U.S. street price of desktop and deskside systems fell 32% in 1992; notebook systems fell 24%. In 1993, those decreases will moderate to 21% for desktops/-sides and 16% for notebooks.

Source: IDC PC Pricing Service, 1993

in the distribution chain (profit-making resellers) it can save up to 9% in the cost of delivering solutions to customers.

- Healthy distribution arm: in addition to distributing Dell PC hardware, Dell also delivers a significant amount of software and non-Dell hardware through the "electronic superstore."
- Effective R&D strategy: with a direct pipeline to customers, Dell calls itself "customer-driven as opposed to technology-driven."
- Strong financial model: Dell has been so successful over the past year that it is making managing to the bottom line look easy. It continues to hit a 5% return-on-sales target, even as industrywide margins plummet.

Can't other manufacturers quickly adopt the successful Dell model? Well, kind of — but not very easily. In fact, Dell and other direct marketers have been so successful that practically every company in the business (AST, Compaq, Digital, and IBM, among many others) has set up a direct telemarketing sales effort over the past 12 months.

Dell, however, believes that the entry barriers to creating a successful and substantial direct-marketing effort are more substantial. Other PC makers will be exacerbating channel-conflict problems when they launch a direct strategy. They will be playing catch-up with Dell, which has market momentum.

Dell claims a significant advantage in structural flexibility. Management indicates that 3,000 of its 4,800 employees are directly involved with customers. It also believes that the logistics of custom manufacturing individual PCs is far more complex than manufacturing standard configurations for the dealer channel.

Dell representative: Michael Dell, CEO

IBM PC Company: Free at Last to Fight for Sales

How tough is Robert Corrigan's new job? The new head of the IBM PC Company still has a fair head of negative momentum to arrest. In fact, IBM's PC competitors used to boast that they could spot IBM a six-month lead and still beat it to market with six months to spare.

Stopping the market share erosion is Corrigan's first goal. After that, the new head of IBM's PC company is faced with a series of daunting challenges, chief among them: managing and cutting a bloated cost structure, managing four primary product lines, and coordinating the most antiquated distribution strategy in the business.

So far, 1993 looks good. Unit shipments are maintaining the strong momentum from the end of 1992. Corrigan intends to focus on costs and expenses and

(Continued, p. 7)

Intel Showing No Signs of Faltering

Intel is one of the industry brand masters. It unabashedly acknowledges that brand management is a fundamental component of its overall, long-term strategy.

That strategy is straightforward, and very solid: drive top-to-bottom family performance and capacity growth while rolling out an aggressive marketing and promotional campaign. Intel cites its financial strength, leadership in microprocessor technology (Intel's new Ireland plant is making 0.6 micron chips), innovation (rapid-fire 486, P5 and P6 rollouts), and branding as a no-lose formula for continued success.

Branded products lie at the heart of Intel's top-to-bottom strategy: LAN cards and fax boards labeled with the Intel name, for example, comprise a serious and growing niche for Intel. Over 700 Intel-PC makers have signed up for the "Intel Inside" print program. Over 400 have signed up for the point-of-purchase program.

It works. For the first time Intel is selling its newest architecture into homes at the same time it is being sold into major business segments. Intel released 35 different versions of the 486. It expects to release another 25 in 1993.

In the next 12-24 months Intel will focus on "natural data," Intel's closet term for multimedia that it expects will make its way into new applications like industrial training, videoconferencing and desktop-to-desktop video.

Today's profits are driving a huge reinvestment in plant and equipment. Both the P6 and the P7 are currently under development. The P6 will be brought to market sooner than expected because of the parallel development efforts (P5 and P6) that were started as soon as the 486 design was solidified. As P5 design work wound down, engineers moved to the P6 effort.

Intel's Juggling Act: Don't Blink

Despite its impressive performance, customer base, end-user demand, and market share, Intel does have several question marks. One is channel inventory buildup. Intel addresses this concern by closely monitoring its customers' just-in-time manufacturing.

Also, some sources have indicated that Intel is having problems cooling the P5. While Intel will only state that the chip "now operates within acceptable guidelines," it may prove to be a bigger problem, particularly in smaller notebooks without expensive and heavy cooling systems.

In addition, Intel must address the bifurcation of its core market. The company needs to move its product line forward in the face of two opposite needs. On one hand, end users with millions of dollars invested in the 386 and 486 PCs want faster, cheaper versions of the same thing.

On the other hand, a slew of new portable/mobile and imbedded-controller products and markets call for more functional chips that consume less power. Apple's Newton and the new 3DO box both run the ARM 610. At the same time, Intel has won relatively few new designs. Exciting new Intel-based form factors and/or Intel-based products with leapfrogging functionality have been limited to notebooks and handheld PCs. Although their market appeal has been undeniable, they don't seem to have the same potential as products that have been completely designed from the inside out to address a new set of end-user needs.

Addressing both ends of the market — new, subnotebook communicators as well as traditional desktop systems — would be nice. But it's very difficult. Intel will undoubtedly continue to provide its core business-computing customers with a conservative, safe upgrade path. The net result for Intel is that demand for Intel PCs will remain strong for years.

Perhaps the greatest challenge facing Intel, however, will come from heretofore relatively insignificant competition from X86 clone maker AMD, as well as Cypress. Intel's expanding sphere of influence in the industry will only continue to attract attention.

To date, it has managed the competitors by slashing price and exploding its product (the 80386, later the 80486) into a product line (SLC, DX, DLC, and different clock rates). With markets broadening and customer needs bifurcating, competitors may have an easier time carving out profitable niches.

Intel is more like a juggler than a batter. It has more than one ball to keep its eye on.

Intel representative: Gordon Casey, director, investor relations

Digital: New Model, Similar Problems

Digital has a new two-step strategy focusing on technology and solutions. It aims to be "a leader in delivering selected technologies, products, and services to the general IT industry." It also seeks to become "a leader in providing IT-based solutions to selected industry-oriented markets." The company called its new strategy "a step down from all things to all people."

Digital's nine new technology and services/sales units give it a leaner, more-focused approach to competing in today's harsh climate. Alpha provides a solid technical underpinning, and the industry-oriented sales groups should help Digital build better relations with its customers.

The separation into product and customer business units (PBUs and CBUs) makes sense. Engineering units will only build products that CBUs have committed to selling.

Digital has, appropriately, narrowed the focus upon core products it will build. It has deemphasized the internal development of all middleware, including NAS, for example. These and other components will and should be sourced externally.

However, the new strategy has weaknesses. The company still has a four-pronged hardware strategy (VAX, Alpha, Intel, MIPS) and a three-pronged OS strategy (OpenVMS, NT, Ultrix). Matrix management is alive and well at Digital. None of Digital's services business needs to build suites of industry-specific applications. Finally, it faces a massive culture-change and turnaround mentality that will require months to execute.

Digital IDs Core Competencies

Digital formed the new strategy centered around what it identifies as the company's core competencies:

- High-performance microprocessors — with 200MHz Alpha, the industry's fastest
- Computer systems and networking — peer-to-peer networking built into the VAX line
- Selected software disciplines — mostly OS, some middleware, no applications
- Systems engineering — what it calls "planned" systems integration

On the product side, the Computer Systems Group is responsible for all systems and hardware, except for Intel PCs, layered software, networks, and research. All other hardware development teams are called Affilliated Products Groups. These include Intel PCs, terminals/printers, storage, and semiconductors.

The affiliated units are much more independent than the CSG group. Products they develop need not dovetail directly into Digital's core strategy. They are expected to be far more aggressive seeking opportunities in alternate distribution and sourcing.

Product Outlook: VAX, Alpha, NT, and Unix

Digital's long-term hardware and software strategy appears to need greater focus. The company that built a reputation with one scalable architecture now supports VAX, Alpha, MIPS-based systems and Intel PCs. These run a variety of operating systems — OpenVMS, Unix, NT, and DOS/Windows. Before it can expect to begin regenerating significant momentum, it will need to send a clearer message to the marketplace.

That message will likely be centered around Alpha. Nonetheless, the company indicated that VAX systems will comprise the bulk of the company's business though 1993. By the end of 1994 it expects revenue from Alpha systems will exceed VAX revenue.

Digital will build desktop and server versions of Alpha systems first. Alpha PC systems will ship "this spring." They will run OpenVMS and Ultrix, as well as NT.

Services Outlook: No CBU Initiatives until August

Digital's services groups were formed to drive scale economies across similar industries. But while management indicates that each group can build solutions out of any combination of Digital and non-Digital components, their actual autonomy remains unknown.

In addition, the reorganiza-

tion creates gaps in Digital's strategy. Most notably, it does not address the facts that customers buy applications, and that Digital does not count applications among its core competencies.

Unlike EDS, CSC, and Andersen, which pinpoint vertical markets with specific applications, Digital will attempt to deepen its penetration without established applications. To fill the gaps Digital needs to articulate how Alpha will enable the development of new applications beyond VMS. It claims that over 1,000 ISVs stand ready to port to Alpha.

Finally, some of the most significant parts of the new strategy will not take effect for months. The process of "rationalizing" hardware designs (by obtaining CPU commitment during preliminary product design phase) will not begin until August. CBU P&L responsibilities will also not begin until then.

Digital representative:
William Demmer,
VP, Alpha and VAX systems

CSC: Steady, Conservative Growth

Succeeding in the ever-more competitive IT services business demands two things, according to Computer Sciences Corporation (CSC). First, services suppliers must be religious about staying out of hardware businesses. Second, suppliers should not be viewed as multiple services suppliers. Instead, they should focus on bringing specific services to solve specific problems.

CSC has, apparently, accomplished both objectives quite well. During FY1992 its bread-and-butter federal government business grew 10% annually. More important, its commercial business grew by 35% annually. During the first quarter of FY1993 both rates slowed somewhat, to 9% (federal) and 15% (commercial).

Moreover, the company has an impressive pipeline of contracts that form a solid base for the next three years.

The company indicates the following key stengths:

- Culture: CSC inculcates a demand for client satisfaction, and stresses client partnership, into management.
- Structure: CSC provides a range of end-to-end services unique among major services providers. Approximately 25% of its systems integration (SI) contracts comes from projects that started with business process reengineering (BPR). Integrating different cultures (SI, BPR, and consulting) has proven difficult for CSC's competitors.
- BPR leadership: CSC's BPR business is growing 40% annually.
- Technology leadership: by leveraging its federal-sector experiences (massive databases, real-time requirements) CSC is well-positioned to address commercial sector requirements.
- Methodology: CSC's "Catalyst" methodology focuses on the most difficult part of providing IT solutions — defining the problem.
- Industry expertise: CSC is particularly well suited to supplying several key industries — telecommunications/cellular, retail/manufacturing/distribution, utility, and aerospace.

CSC representative:
William Hoover, CEO

Legent Corporation: Adjusting Downward

One of Legent's primary aims these days is to change how it is perceived by customers and potential customers. It is attempting to change the perception that it is a mainframe-only systems-management tool supplier.

Instead, the company is seeking to tap new markets. It contends that even as customer organizations downsize, rightsize, and install standards-based systems they will continue to require strong systems and network management products. As a result, Legent is aggressively developing client/server systems management tools.

Legent's "most cherished asset" is its connection and relationship with customers' IS groups that continue to need help managing systems. Only now they're client/server systems and networks.

Legent cites three critical intiatives for the coming year. It is evolving its existing products to operate with smaller and more powerful distributed systems. It is extending its range of solutions into new downsized environments. And it is developing new products for new needs unique to their new customers' installations.

The program seems to be proceeding. Sales to new customers

(growing 23% annually) are outgrowing overall revenue growth (20%). Approximately 30-35% of its overall revenue is derived from non-mainframe products.

Legent representative: John Burton, CEO

Borland Seeking Stability

Amidst a sudden decline in market value following missed release dates, Borland outlined its opportunities in the coming year to effect a significant turnaround.

Central to the turnaround is the shift in market leadership in applications, languages and database during the movement from DOS to Windows. Borland noted that Microsoft is now the established spreadsheet and word processing leader, but hinted that languages and database might be different. As the new Windows markets develop, building unit market share is the name of the game.

Borland has set aggressive goals for itself. At the end of 1993, management seeks 35% of U.S. units in spreadsheets, 50% of languages units and 50% of database units.

How? Borland expects to achieve these goals with a three-pronged strategy: by building "best-of-breed" products, by being the lowest-cost producer, and through aggressive marketing.

Building best-of-breed products draws on the company's object expertise. Borland claims to have the most complete range of object-based middleware and servers. It expects to be the lowest-cost producer as a result of a recent reorganization that scrapped a product-oriented organization in favor of a functional one. It has rolled out aggressive pricing for QuattroPro ($99.95 with a 90-day trial period) and Paradox for Windows ($139.95 with a 90-day trial period).

With respect to the missed releases, Borland indicated that it underestimated the difficulty of getting object-based applications to market. It indicated that those problems are now behind the organization. In addition, Borland feels that the initial investment in object systems will still pay off. The object-based applications are, according to Borland, more functional, and will be easier to upgrade to an even higher functionality.

Borland representative: Alan Henricks, VP, Finance and Operations

IBM PC Co.

(continued from p. 3)

expects to drive gross margins to levels similar to those of his competitors. Then, of course, there's the simple problem of coordinating the marketing and positioning of five major PC lines — PS/2, Value, Ambra, Mobile segment, and PS/1.

Each appeals to different segments of the overall PC market. PS/2s are bundled with loads of service and support for high-end corporate users. The Value line is for customers who want IBM, but not the same level of service. Ambras are designed for extremely price-conscious customers. PS/1s go into the home, while IBM's Mobile PC group is expected to roll out several new products on the heels of the critical acclaim achieved by the TP700 color notebook.

IBM has several things going for it. Clearly, the PC market is a "must win" for the company. The PC Company should get the best and the brightest IBM engineers during the reorganization.

In addition, IBM knows what it doesn't know. It is in the process of further defining each of the specific PC markets it is addressing with its five lines. As Dell has shown, that knowledge will allow IBM to build better products for its core customers, which in turn drives brand image.

IBM PC Co. representative: Robert Corrigan, president

Complexity, Maturity, and Secular Decline: "It's The Business Model, Stupid"

The stark difference between the industry's two largest diversified systems companies and a host of highly-focused competitors has moved from merely apparent to downright ominous. What can the highly-complex, highly-integrated and mature Digital and IBM do to regain the competitive edge?

One thing is sure. Management changes will not, alone, be nearly enough to recast them as hungry, aggressive competitors, and enable them to survive the incipient industry transformations.

Such a statement is likely unnerving, even offensive, to companies like Digital and IBM. But dealing with the problems now is far better than the alternatives. Avoiding the problems may mean that the worst — more losses, even huger layoffs, and a massive exodus — is yet to come.

Both Digital and IBM are characterized by layers of intelligent, aggressive management. Both happen to be older (over 30 years) computer companies. Both happen to be managed by a generation of older executives who gradually moved upward through the system to positions of great responsibility.

One might draw some conclusions here. Does the companies' age preclude them from successfully competing in today's computer industry? Does the age of their executives prevent them from practicing effective management techniques in today's computer industry?

Hardly. A company's fortunes and outlook are tied to many more things than simply its age, or the age of its executives. Look, for example, at technology companies Intel, Motorola, HP and Seagate. All are older companies. All are managed by executives on the long side of 50 years. All are diverse technology companies with major investments in multiple markets. And all are incredibly successful companies holding leadership positions in their industries.

Or, look at solutions companies Andersen, CSC, EDS, and HP (again). Same story. Neither company age nor the age of top management clearly affects company performance.

Computer companies live and die by their business model — their scheme to identify opportunity, build a good product at a competitive price, and get the product to customers efficiently.

Successful and diversified companies are able to focus (in the words of too many presidential candidates "like a laser beam") on opportunities and markets in spite of their diversity. Unsuccessful companies are not.

Back to Digital. Just how solid is the new business model? After the recent major restructuring, can it really believe it can still support three different hardware lines? Four different operating systems? Is this really a well-focused strategy?

And IBM. Its recovery plan seems logical and solid. But how will management slice and dice IBM's range of tangible and intangible assets? Who gets what how? And which are the crown jewels? IBM is not so much looking for a general manager heir to John Akers as it is a portfolio manager.

He or she will collectively manage a loose confederation of companies. Picking the executives to run each unit and allocating resources to each unit may well be his or her sole involvement with each unit. Then, theoretically, business decisions will be made by business unit executives. They will, in theory for the first time in a long time at IBM, be able to focus on specific problems and ignore noise like "the Big Blue family" and "politically correct career moves."

Energy and aggressiveness are only part of the solution. Rebuilding a company means focusing on wholly new opportunities. It means realigning product strategies (i.e., harvesting and shedding old lines). In the commercial systems business it means inculcating the belief that protecting customers by any means other than rigorous and vigorous downsizing is paternalistic and shortsighted.

Reconstructing around a weak business model is a recipe for more failure. Dillydallying on the way is worse yet. The rich heritage of each of these companies demands nothing less than excellence, and there is still room for improvement.

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Recovery and Redistribution: Preliminary 1992 Financial Results and 1993 Outlook

For U.S.-based vendors as a whole, *recovery* was the keyword for 1992. The U.S. IT market for the first time in more than a decade grew faster than its counterparts in Europe and Japan. Even the worsening economic climate in many significant overseas markets did not seriously dampen the spirits of most U.S. IT companies.

In Europe U.S. companies gained share against local competitors in virtually all sectors, although in Japan the position of U.S. companies other than IBM is still so marginal that the weak Japanese market had comparatively little effect on their results. Moreover, U.S. companies could have received an additional 5–6% on their European and Japanese business due to currency translation, depending on their mix of business and hedging practices.

For individual companies, the operative term was often *redistribution*: the redistribution of market shares to the quickest, most flexible and reactive vendors within sectors and the redistribution of IT spending towards software and services. The U.S. IT recovery, like the recovery of the overall economy, has not been so robust that it could become the proverbial tide that raises all boats. When IT recovery still means single-digit growth, it can be as unforgiving of mistakes and bureaucratic lassitude as recession.

IDC's database of over 100 U.S.-based vendors' quarterly financial results indicates the following:

- Composite revenue grew 9% in 1992 over 1991, 8% without the semiconductor manufacturers whose products represent a considerable degree of revenue double-counting with the hardware vendors in the sample.
- Without the burden of IBM, the composite revenue of the remaining companies would have risen 14%. Without the major traditional systems vendors in the sample (Amdahl, Control Data Systems, Cray, Data General, Digital, Hewlett-Packard, IBM, Tandem, Unisys, and Wang), total revenue would have climbed 18% in 1992.
- Revenue growth during the fourth quarter trailed the average annual growth, at 5% over 4Q1991 compared to 9% for the year as a whole. However, this dip is due entirely to IBM's exceptionally weak results. Total sample growth without IBM was actually slightly stronger for the fourth quarter (15%) than for the same companies for all 12 months of 1992.

IN THIS ISSUE:

Counterpoint in 1993 2
Computer System Suppliers' Results 2
Personal Computer Suppliers' Results ... 3
Storage Suppliers' Results 4
Communications Results 4
Dealers/Resellers Results 5
Software Suppliers' Results 5
Semiconductor and Component Suppliers' Results 6
Services Suppliers' Results 7
The Fall and Rise of U.S. IT Vendors 8

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The sample as a whole was deeply in the red for the year, due primarily to IBM's mind-boggling $5 billion loss. Without IBM, after-tax margins for the sample would have increased from an average of 1% in 1991 to 3% in 1992. However, IBM was far from the only victim of the treacherous crosscurrents swirling through the industry. The proportion of companies in the sample reporting losses for 1992 as a whole was about the same as for 1991 — a very uncomfortable 29%, compared to 27% for the same companies during the previous year.

Obviously the effect of IBM's special charges was even sharper for the quarter than for the year. Without IBM, though, the fourth quarter was, as usual, generally stronger for companies' bottom lines than the year as a whole. The average after-tax margin for the sample minus IBM increased from 4.0% in 4Q1991 to 5.5% for the final quarter of 1992. Pretax results tell the same story. Without IBM, pretax margins would have increased from 4% in 1991 to 6% in 1992, and from 6% to 9% for the fourth quarter.

Counterpoint in 1993

The two themes of recovery and redistribution should continue to interact throughout 1993 and for the next couple of years. IDC's Global IT Survey indicates that the wary mood of IS supervisors, CEOs, and LAN managers in the U.S. persists, with only 3–4% average growth projected for 1993 IT budgets. We anticipate that the accelerating economic upturn should free more money for IT. However, the cautious stance of IT buyers suggests that vendors' U.S. revenue growth will be more or less on a par with 1992 results.

Overseas, the IT Survey suggests that the European IT market, like the overall European economy, will probably not pull out of its doldrums in 1993. However, U.S. companies can expect to continue to pick up market share from local competitors in 1993, which should somewhat cushion them against the effects of economic weakness and confusion in Europe. Only a handful of U.S. companies have a large enough stake in the Japanese market to be at risk, and most of them should pick up market share in 1993. Elsewhere in the world, the IT markets in the U.S.'s trade partners should receive a boost from the revived U.S. economy.

But many companies will not benefit from the continuing modest upturn. IDC as a rule does not forecast market shares, but in today's environment it is imperative to understand that the sharp division between the haves and the have-nots will endure for at least the next couple of years, and will also gradually penetrate several previously insulated high-growth areas. The following discussion of separate sections of the IDC database will address some of the pressing issues creating these divisions.

Computer Systems

The contrast between winners and losers does not get much sharper than between IBM and Hewlett-Packard in 1992. IBM's hardware sales plus its rental/finance revenue fell 7% for the year, including a precipitous decline of 18% during the fourth quarter compared to 4Q1991. HP, however, saw its computer-related revenue climb 19% for the year, and 24% for the quarter. No one expects a major turnaround for IBM anytime soon although HP can build on computer-related orders that grew 27% in the fourth quarter from the previous year.

No turnaround can be expected in the mainframe market. U.S. respondents to the IDC Global IT Survey with S/370 and/or S/390 mainframes expect only a paltry 8% growth in total mainframe and mini MIPS installed in 1993. Some of this growth will certainly not be on mainframes (over a third of the IBM S/3X base, as with U.S. survey respondents as a whole, are moving to smaller, distributed systems or focusing new application development on smaller systems). And there is no guarantee that the new mainframe MIPS will be coming from IBM. Not only are the PCMs once more resurgent, but the used market remains a viable option, especially with IBM retrofitting new capabilities to the immediately previous mainframe generation.

Nor is the traditional midrange market for mini and supermini computers much more attractive. The AS/400 from IBM remains the most successful midrange proprietary architec-

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ture, but chinks began to appear in its armor in 1992. Smaller models exceeded plan, especially in the U.S., but the high-end AS/400s stuttered. IBM attributes some of these problems to a dismal fourth quarter in Europe however users are also aware of Big Blue's plans to move the AS/400 to a RISC-based processor in 1994. This suggests that even with the kickers announced in February 1993 and IBM's public projections of 3–4% growth for the line this year, discounting will impinge on AS/400 business throughout 1993.

Digital scraped through 1992 with flat revenue and slightly lower product sales, which can be considered a moral victory for the company's Alpha Ready upgrade program. Nonetheless, IDC does not anticipate strong volume shipment for Alphas in 1993, since by even optimistic reckoning software will not be widely available until early 1994. This suggests another year of minuscule growth opportunities and another loss of midrange market share.

So that leaves the future to Unix systems running on Intel or standard RISC architectures, right? Well, not necessarily. The biggest midrange success stories in 1992 were Unix products, true, but they ran on homegrown, essentially proprietary RISC platforms: HP's 9000 PA line, now clearly dominant over its non-Unix, proprietary OS 3000s, and the RS/6000 from IBM, with half of the revenue for its larger "server" models deriving from the commercial multiuser market. Even Sun's 11% growth paled beside the explosion in HP and IBM's Unix business (not to mention the fact that it paled beside Sun's historic growth; Sun's pretax income slipped 33%).

As for the Intel/standard RISC base, many of the vendors (e.g., Data General, Bull, and Unisys) are still straddling proprietary and "open" architectures, with decent growth in the latter not yet compensating for losses in the former. And among the multiprocessing innovators, there were far more losers (Alliant, Encore, Pyramid, and Sequoia) than winners (Sequent and, much more modestly, Stratus).

There was, to be sure, considerable "midrange" business on Intel-based platforms, but a lot of it didn't go to midrange vendors. A couple of years ago regular PCs running Unix became adequate mini substitutes if customers only had a few terminals to run off the host. They remain a viable option, but today the principal threat is PC LANs. U.S. respondents to IDC's Global IT Survey report that as of the end of 1992 almost 60% of their PCs are on LANs. By the end of 1993, they expect this ratio to rise to over 70%. The PC LAN is the true legacy of the vision of distributed computing originally championed by Digital and the other minicomputer pioneers.

Local area networks still have a long way to go before users will transfer most of their significant computing tasks to linked PCs. However, midrange vendors are betting that coexistence with PC LANs in a client/server environment is the wave of the future. Already a fifth of the U.S. survey base are telling IDC that they are moving or have moved to the client/server paradigm, another fifth are planning to move, and still another fifth would like to but aren't sure how. They may not all mean the same thing by the term, but for midrange players what matters is users' rapidly changing perception of what they will require in the future.

With the proliferation of LANs and the growing acceptance of client/server computing, the most significant contest in 1993 and the next couple of years for what had once been mini manufacturers' turf will be between Microsoft and Novell.

Personal Computers

The 27% year-to-year growth in 4Q1992 for our universe of PC suppliers was even stronger than prior quarters' performance, since the average for the year was 21% growth. However, the sample is biased to the industry winners in 1992 because it excludes the PC business of IBM and other systems vendors and the no-name privately held companies that lost market share. The strong showing of the vendors in the database testifies to their market share gains, based on their ability to deliver sufficient unit growth and expense control to offset the effects of lower average selling prices.

Throughout 1992 the distinction between haves and have-nots has been pronounced in the PC arena. Industry winners have experienced a year of strong unit and revenue growth, as well as steadily increasing market share. At the other end of the spectrum, the challenge has been simply to stay in the game, as the distance between the Top Ten and the rest of the industry has widened.

Of course, the PC market has always had its share of companies seizing a brief moment in the sun, only to plummet earthward a year or two later. The fallout on PC manufacturers from the 1992 price wars, though, has been much more severe than a couple of highly visible failures would suggest. Preliminary data from

IDC's annual census of computer shipments indicate an unprecedented degree of consolidation, with many vendors cited in previous editions of the census vanishing altogether.

Moreover, even the strong companies have encountered setbacks. Although profits for the year kept pace with revenue growth, for the fourth quarter the strong revenue showing coincided with a 30% drop in total profits. The primary factors were lower net income levels for Apple and AST and Commodore's heavy loss. Even Dell had to adjust investors' exuberant hopes downward by warning beforehand that fourth quarter results would lag behind analysts' estimates. The revision represented a shortfall of about 10,000 units during a broad-based product transition early in the quarter.

The PC business will remain highly challenging in 1993. The latest round of price reductions suggests that suppliers will continue to focus on value per price point as a means of sustaining growth. But suppliers will not be focused on price alone. They will emphasize service and support issues and enhanced feature sets and will attempt to augment existing channel relationships and tap new geographic opportunities.

In particular, many U.S. companies have high hopes for the Japanese market. They are encouraged by the weak domestic economy, which spotlights the high prices paid for NEC and other proprietary PCs, and the gradual emergence of a DOS-V standard for what used to be called "IBM compatibles." Market share gains for U.S. PC manufacturers in Japan are likely in 1993, but they may well be temporary, and even in the short run Japanese sales will represent only a small fraction of U.S. companies' business. Europe may be a better bet, as major manufacturers recoup the ground lost in 1991 and 1992 to no-name PCs.

Storage

Given the combination of strong PC demand and supply constraints, it is not surprising that the Winchester industry had one of its best years ever in 1992, with our universe of companies posting a 23% increase in revenue. This momentum holds even if we include the Winchester business of the computer systems suppliers. Only the Japanese suppliers encountered a slowdown in business, primarily due to company-specific product transitions.

Accompanying this generous top-line growth has been prolonged stabilization in prices, which has allowed for meaningful margin expansion. For such companies as Maxtor and Western Digital, this meant a second chance to carve out a niche in a difficult business.

By the end of the fourth quarter, we observed signs that the industry had achieved a balance between supply and demand. The strength in high-end demand continued to support a brisk 26% rate of revenue growth; however, pricing pressure for mainstream PC-class drives accelerated late in the quarter. This adversely affected margins for some suppliers relative to the previous quarter.

We expect the disk drive business to remain healthy in 1993, but foresee an emerging gap between winners and losers. Companies are fashioning strategies trading volume off against product mix and diversification against focus. In IDC's view, a sharp eye on costs will be the ultimate criterion for success in this sector in 1993.

Communications

Once again, the fourth quarter reveals a flourishing LAN/internetwork market, which dominates the sample of data communications vendors in the IDC database. The strong demand for LAN products in 1992 surpassed even our optimistic projections for unit growth. The injection of higher volumes of PCs into the user base fueled much of the growth, but even more critically, the market is being fundamentally transformed as major corporations and many small businesses make LANs their information and networking backbone. Heavy infrastructure investment keeps demand so high that margins can also stay high, despite the sharp price cuts in PCs.

The LAN/internetwork market is one of the few segments represented primarily by winners, with virtually no losers. Looking forward, IDC anticipates that strong, broadly based growth will continue as a function of even higher connectivity rates and the increasing dependence on LANs at user organizations. Even after the market begins to shift away from new LAN sites to repeat and add on business, it should easily remain strong enough to support the current group of players without significant consolidation or casualties for the next couple of years.

Margins exhibited by the communications companies in this database are still expanding dramatically. Overall, the software and high-end hub and router companies (e.g., Novell, Cisco, and Cabletron) have experienced the strongest profit margins. Price competition is still significant only in the low-end hub and card markets. Stable prices in the mid-to high-end hub market are expected

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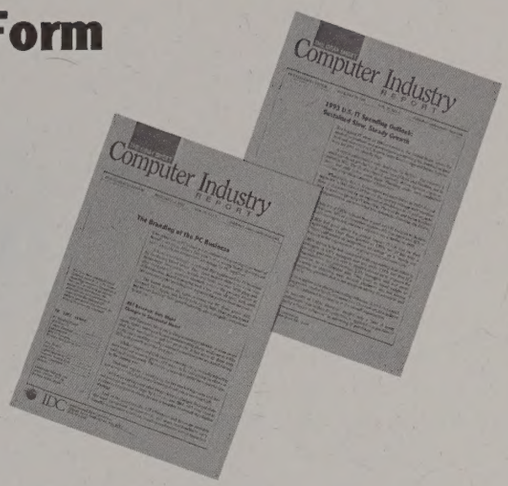

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to continue through the first half of 1993. Customers in large corporations will remain a captive audience and will continue to pay for features at the high end.

The basically stagnant traditional data communications products like modems, multiplexers and front-end processors are typically sold by privately held companies or as a minor segment of major corporations like IBM and AT&T and are therefore not broadly represented in the database. Despite the pressures on these product areas, though, US Robotics, which has tapped into the high-volume, low-cost mass market, proves that companies can make money even in modems. IDC believes the strong growth in the consumer PC market will help drive modem sales through 1993, and could remain a significant market opportunity as consumers tie their home PCs and portables back into the office.

Dealers/Resellers

The 20% growth for 1992 as a whole in this segment of the database is somewhat exaggerated by the mergers and acquisitions the dealer/reseller segment has experienced, just as the meager 4% expansion in the fourth quarter is primarily a function of the problems facing JWP. Nonetheless, the performance is impressive and can be attributed to the high unit volume in the PC hardware and software markets.

On the other hand, margins for most of the players continued to shrink in comparison to 1991. The low margins, due in large part to the PC pricing wars, are expected to stabilize, but to remain at this low rate in 1993. The dealer/reseller margins, while among the lowest in the IT industry, have typically been high when compared to other retail channels. Now the margins have been brought more into line with their counterparts.

Most of the weaker, smaller resellers have already been absorbed or squeezed out due to PC pricing pressures and market dynamics. Because the channels remain in flux, however, vendors in this sector will have to continue to adjust rapidly to changing conditions. Among the most crucial trends reshaping channel directions are the move towards direct-response sales by PC manufacturers and systems vendors and the emergence of alternative-channel retailers such as Circuit City and of superstores such as CompUSA.

Traditional resellers have watched with anxiety and resignation the expansion of companies like CompUSA (58% growth in 1992 fed primarily by the large number of new outlets opened last year, with some store sales up 16–17% for the year). Unable to compete, they have been forced to position themselves as corporate resellers. While continuing to offer a broad array of products, they have largely abandoned storefront sales in order to lower costs.

The restructuring and consolidation of this segment will continue as alternate channels become stronger. Even if, as IDC anticipates, the PC pricing wars are mitigated in 1993, the keys to success will be quick adjustment to the new rules, cost controls, and effective exploitation of other revenue sources. We expect that service and support offerings will help differentiate winners from losers in 1993.

Software

The software segment of the database displayed consistently high overall growth rates throughout 1992, with a fourth-quarter revenue expansion of 18% not too distant from its 21% growth for the year. The weak 4Q1992 results for Lotus became the major differentiator between the quarter and the year, although in evaluating software results it is always necessary to appreciate the extent to which the sectoral growth rate is always a mixture of high-growth and retreating companies and submarkets.

The biggest losers in software in 1992, though, would not appear in our database: the systems vendors. The 21% annual growth in the software section would drop to 14% if IBM's weak software revenue were added to the total of independent software vendors' incomes. IDC's software program has estimated on the basis of a broader sampling of software companies that, while all U.S. ISVs grew at an average 19% in 1992, the software business of systems vendors grew only 5%.

Systems vendors were hurt by their dependence on proprietary, often mainframe-oriented solutions. They still managed double-digit growth in tools such as DBMSs (although even so at a lower rate than the ISVs achieved), but they barely kept pace with 1991 results in application software and in operating systems and other data-center-oriented programs like IBM's SystemView. Even when a systems vendor has best-of-breed code, as Digital has with its sophisticated middleware for tool interoperation, it all too often restricts its market by declining to move its software to a wide range of other platforms.

Similar issues helped determine the winners and losers in the high-end segment of the software market. Vendors typically

prospered if they were quick to respond to such market influences as downsizing, cross-platform interoperability, and Unix. Data center vendors such as Legent swiftly addressed these trends and emerged with strong yearly growth. Oracle and Sybase, taking advantage of the outstanding growth in the Unix RDBMS market, also emerged as winners for 1992, and appear well positioned to prosper from the continued growth of this sector in 1993.

Several important new market dynamics emerged in data center and other high-end software in 1992. Arguably the most important was the beginning of non-tiered pricing strategies. Users are demanding more flexible pricing and licensing terms that do not dictate or obstruct their topology choices. Currently a few vendors are examining the option of embedded license management software to meter concurrent users. IDC expects the first practical implementations of this innovation in 1993.

Among others, we saw an increasing trend towards object-based products, which IDC expects to continue their high-growth trajectory in 1993. However, CASE is still intimidating for many users; vendors are finding that it is easier to sell CASE components through workbenches rather than as a complete bundle. Finally, 1992 saw the trend towards mergers shifting instead to development partnerships. Although major vendors will continue to buy smaller companies to supplement their current activities (CA, for example, still needs an effective entry into PC software), IDC believes partnerships will dominate the market through 1993.

In the PC software arena, the key to continued success is the ability to offset pricing pressures through strong distribution, marketing, and product strategies. The clear market dominator for 1992 was Microsoft, which even with major question marks (like NT) and antitrust investigations remains in a strong position to sustain its overwhelming presence. Lotus was hurt by the migration from DOS to Windows and just barely managed a little forward momentum for the year as a whole. Borland was an even more obvious loser as the stiff pricing competition, which sharply accelerated in the fourth quarter of 1992, forced its revenue share of the market down drastically.

We expect the continuing PC software pricing wars to further limit the number of successful PC software companies through 1993. IDC expects to see more smaller companies dropping out of the market or absorbed by the bigger players. If a giant like CA does intend to offset its overreliance on mainframe software, it could have a number of possible acquisition targets by the end of the year, possibly including even Borland.

IDC also expects to see an increase in polarization between the high-end and low-end PC software product categories and target markets in terms of pricing and distribution. The low end, especially the consumer PC software market, may provide the biggest opportunity for some of the smaller companies.

Semiconductors and Components

The 1992 recovery was especially obvious in the chip business. Revenue for this section of the database leapt 24% for the fourth quarter, and 15% for the year as a whole. Moreover, much of this growth fed directly into beefier bottom lines. Composite after-tax margins increased from 3% in 1991 to 7% in 1992; pretax margins for the year rose from 6% to 10%.

The semiconductor and component sector was a notable beneficiary of the strong unit volume of PCs in 1992. Intel's microprocessors were highly visible winners, but the strong PC growth also fed into stronger business for DRAMS, networking chips, disk drive and VGA controllers, and almost anything else that can fit inside the skins of a personal computer.

To be sure, a degree of redistribution was inevitable. Among the winners were Intel, which gorged on the high volume of lower-cost 486 PCs in the second half of the year, and Cirrus Logic, which now dominates the markets for disk drive and VGA controllers. Among the losers were Chips & Technologies, which has had to drop its plans to compete in the 386 and 486 markets, and LSI Logic, which had bad luck in some of its earlier business decisions (e.g., its bet on the MIPS RISC architecture). AMD presents a mixed picture: its vigorous expansion in the first half of the year allowed overall growth of 23.5% for 1992, but due to the legal losses that forbade 486 shipments just when the market was shifting so rapidly from 386s, AMD managed only a 9% jump in the fourth quarter.

The most significant redistribution, however, was geographic: U.S. semiconductor manufacturers gained share against the Japanese. The strong showing of U.S. vendors contributed to the turnaround, but so too did the effect of the weak Japanese economy and the toll it has taken on the corporate giants — like Fujitsu, Hitachi, and NEC — that dominate the Japanese chip

business. One need not subscribe completely to past arguments about massive dumping to gain market share to appreciate the loss of pricing flexibility as the Japanese companies' captive markets stalled and their pretax margins slipped to the 1% range.

IDC sees no reason why these trends should not continue through 1993 and sustain another year of strong double-digit growth and good margins for the overall semiconductor sector. AMD's clean-room 486 should end Intel's monopoly position in that chipset, but by the time it ships, Intel will be ramping up volume Pentium production. Meanwhile, the U.S. industry as a whole can expect a second year of market share gains against Japanese competitors.

Services

The services sector of the database had strong growth for the year as a whole, with composite revenue up 18% from 1991 and after-tax margins staying in the 6–7% range. The growth story extended to many systems vendors as well. IBM's new services revenue column ballooned 32% in 1992, and grew from 7% of total IBM revenue in the first quarter of 1991 to over 12% in the third and fourth quarters of 1992.

But there are no sure bets. Fourth-quarter growth was lower for most companies in this group than they achieved for the year as a whole. In the case of EDS, which grew 22% over the first three quarters of 1992 compared to the same period in 1991, fourth-quarter expansion dropped to only 3%. Even IBM had significantly lower (albeit still double-digit) services growth in the fourth quarter than for the year.

IDC does not believe that the fourth quarter is the first harbinger of winter for the high-flying professional services sector. However, it should serve as a warning that, while IDC continues to project strong double-digit growth for U.S. vendors' professional services business for the next several years, there are inherent limits on growth for any market, and that some of the dynamics that will ultimately divide winners from losers in the services business are already emerging.

First, much of the growth comes from the transfer into the marketplace of activities that would otherwise be financed internally by IS organizations. The good news is that, to the degree that this is business that has never existed before, services can avoid the struggle for market share that is becoming the principal means of growth in other IT sectors. The bad news is that corporations and public sector organizations usually had good reason to slough off these activities, which were often too people-intensive for adequate payback. Companies that depend heavily on writing and maintaining code may someday wind up with many of the same profit-margin problems that got them the business in the first place.

Services companies seem very aware of this problem, for most are aggressively pursuing activities that will increase their margins by moving from the implementation to the planning stages of IS activity. EDS's vertical market focus is designed to give it the expertise to know, say, a health provider's needs and possible options much better than the health provider does. It is also necessary for services companies to anticipate the next areas where users will require assistance. The interface of telecommunications and data communications will be critical over the next half decade, since this has become the focus of much recent merger activity and discussion (e.g., the semipublic negotiations between British Telecom and EDS).

Second, IDC estimates that over 60% of the U.S. professional services market in 1992 still derived from federal, state, and local government contracts. Growth over the next half decade, however, will center on the commercial market. This means that some major suppliers in today's professional services market may not be equipped in expertise or management practices to compete as effectively as they have in the past. Commercial organizations will demand a level of attention to the bottom line that many PS providers never had to acquire during their years of government service.

This transition will in all likelihood create an interesting competition over the next five years between companies specializing in professional services and the systems vendors like IBM and Digital. PS vendors will argue that they avoid the inherent biases towards a specific hardware or software solution that systems vendors would inevitably bring to the table. Systems vendors will counter that they understand the environment and issues in commercial computing better than the Beltway bandits.

To a significant degree, they will both be right, but customers will have to choose. The resulting decisions will become a major cleavage point between winners and losers in the services sector.

The Fall and Rise of U.S. IT Vendors

In 1992, for the first time in over half a decade, U.S.-based IT vendors gained market share against their international competitors. Was this a temporary phenomenon, or part of a global turnaround? After all, it wasn't that long ago that pundits were writing off the U.S. economy and awarding the future to Germany and Japan. Today, though, the U.S. recovery gains momentum each quarter, with few dark clouds visible on the horizon other than, ironically enough, the weak prospects for exports to Europe and Japan.

The situation with vendors, however, is much more complicated than the relative ups and downs of national economies. The relative decline of U.S. IT vendors in recent years has been a function of five largely distinct variables:

National economies. Even if this isn't the be-all and end-all, it's certainly part of the equation. Obviously U.S. companies had a ceiling imposed on their growth potential by the fact that on average around half their business occurred in the slower-growing U.S. IT market.

Semi-closed markets. U.S. companies were able to participate fully in some of the higher foreign growth opportunities in Europe, Latin America, and the Asia/Pacific, but not in the country with the highest IT growth rate of any developed economy. As the Japanese IT market expanded to just under a fifth of the global total, the primary beneficiaries were domestic providers.

Shift to PCs. The "IBM-compatible" market always carries the seeds of rapid changes in relative vendor rankings. In general, major U.S. suppliers gain share when new chip generations are in the early phase of volume production, and lose share to local no-names in later phases.

Shift to services. As the global shift from computer hardware to software and services has accelerated, U.S. vendors have stood to gain in packaged software, but the much larger professional services market has remained predominantly local.

Currency fluctuations. In general, over the past five years exchange rate gyrations have added extra share to foreign vendors ensconced in high-growth local markets (e.g., domestic European professional services providers and the major Japanese manufacturers).

In 1992, some of these variables turned in the direction of U.S. vendors. The U.S. IT market did expand faster than the Japanese or overall European markets, while the weak domestic economy hamstrung Japanese manufacturers both at home and abroad. PCs hurt the U.S. share over the first half of the year, but the 486 explosion in the second half strongly bolstered major U.S. companies' position in the U.S. and Europe.

Meanwhile, in professional services, many smaller customer sites cut back on their contracts with smaller, predominantly local providers. The position of the larger services providers also benefited from the higher proportion of their business that comes from major long-term contracts rather than new business. The bottom line for 1992 was that more of the larger services providers are based in the United States. The only serious impediment to major gains for U.S. suppliers in 1992 was in fact the exchange rate.

What can we expect over the next half decade? IDC does not forecast worldwide economic trends, nonetheless it seems likely that the U.S. will outperform Europe and Japan for a year or two, but that growth rates will be more comparable afterwards. IDC does not expect a major reconfiguration of market shares in Japan, at least during the next half decade — it will probably remain a relatively inhospitable environment for nondomestic vendors.

In PCs, Europe will probably see further gains by U.S. manufacturers over the next couple of years now that the price differential from no-name PCs and from the same models in the U.S. has sharply diminished. These gains will depend partly on their reputation for quality, and partly on their economies of scale during the manufacture of vast quantities of systems.

In services, local providers will regain momentum after the recession lifts, but larger IT customers may still be drawn to the ability of large U.S. companies to offer integrative services over a broad geographic expanse.

The net result, IDC feels, is that whereas the worldwide loss of market share may have been arrested, there will be no dramatic overall gains for U.S. vendors over the next half decade. Nevertheless, it seems probable that their decline has been at least temporarily arrested.

Ronald C Bellamy

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DOUG McLEOD, EDITOR | MARCH 12, 1993 | VOL. 28, NO. 9 | Published continuously since 1964.

IBM and Digital Unveil Reorganization Plans: New Structures, Strategies, and Goals

IBM and Digital Equipment are spreading their new gospel — reworked business models and corporate structures. Digital's Robert Palmer has one advantage: he knows who his bosses are. IBMers know only that their new CEO will probably be someone from outside the company, and will likely be hired within a month. As a result, some of the changes currently under way at IBM may be but transitory at best; likewise the names and faces of some of the changers.

That said, IBM seems to have a clearer view of how it will get to where it wants to be. It has chosen a more distinct separation of its diversified product-oriented businesses. The other portions of the old IBM acount for a new services business: trading areas (over 60 geographic and vertically-oriented groups) at the local level, and national management consulting, professional services and outsourcing groups.

Digital's reorganization is somewhat similar. It too is characterized by product and services business units. There, however, the similarity ends. Digital's customer services organizations are grouped into broad vertical segments. Independent product groups are limited to PCs and storage products. Systems, software, and microprocessor development and marketing organizations are grouped together. Following is an analysis of Digital Equipment's reorganization and an update from IBM.

Digital: Choosing a Path of Compromise

During the 1980s, Digital's mission was relatively simple — the company was dedicated to building the industry's finest set of distributed processing tools — VAX, VMS, DECnet, etc. This product-based strategy was, of course, a major success and became the driving force behind today's multibillion dollar company.

By 1990, these three core tools had clearly run their course, and Digital began to suffer seriously. Several years of financial pain were endured before the need for change was officially recognized. Then Digital, now under Bob Palmer, faced four main options:

1. It could increase its product development efforts to try (against considerable odds) to recapture product leadership from Intel, Microsoft, Novell, Cisco, Oracle, et al.

IN THIS ISSUE:

IBM and Digital Reorganize 1

Digital Organization Chart 2

The New IBM: Talk and Action 5

IBM Hardware and Software Gross Profits Margins, 1990–1992 6

IBM ROE by Business Segment, 1987 & 1991 7

IBM's New Mantra Should be "Distributed Computing Leadership" 8

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2. It could de-emphasize building products and instead use products built by others to provide advanced distributed computing services and solutions. (Such a transition would be traumatic given that hardware and software products still account for the majority of Digital revenues.)
3. It could take the purist approach and radically separate its product and services businesses (a la IBM) to make both activities prove themselves in the market.
4. It could try to find a way to make significant financial progress by blending all three strategies into a workable mix of meaningful, yet manageable, change.

In our view, Digital's December 22, 1992 reorganization reflects Plan #4 thinking. Accordingly, major product investment is being made in Alpha, NT and Unix (Plan #1); primary P&L responsibility has been given to Digital's industry services groups (Plan #2); and important but non-essential activities (PCs, storage, printers, components, and multi-vendor services) have become largely autonomous business units (Plan #3).

Looked at another way, there are now essentially two Digitals: the traditional integrated systems Digital, and a dis-integrated product and services Digital.

For the integrated VAX/VMS/DECnet/Alpha/Unix Digital, overall P&L responsibility now rests squarely with the industry marketing groups while core system and software product development is viewed largely as required infrastructure. Here, the new organization reflects a shift from an engineering to a services-driven company, with much more direct financial accountability.

In contrast to this legacy systems structure, a second dis- integrated Digital consisting of multiple independent business units — PCs, storage, components, and multi-vendor services has emerged. Because entry and exit barriers in these areas are relatively low, each can succeed or fail on its own merits without dramatic effect on the rest of the organization.

A key difference between the two structures is that the integrated systems business includes most of the company's long-term established core competencies. The dis-integrated part of the company is perhaps best described as opportunity-driven and is more subject to change.

From a broader industry point-of-view, the integrated systems business has been and continues to be in a state of secular decline, while dis-integrated IT product and services activities have been growing rapidly.

Does the Reorganization Make Sense?

There is some compelling short-term logic. The new structure represents an important recognition that substantial change is required; it will also inject badly needed accountability into many parts of the organization. In addition, such low-margin businesses as PCs, storage, and printers can at least theoretically get out from under Digital's high corporate overhead while the Alpha organization remains intact during a crucial roll-out period.

The long-term logic is more open to question. At the heart of Digital's integrated-system thinking is a belief that, by organizing itself around its customers, not only will its services business grow, but the company will have a better idea of what core products it should build. In other words, actual customer needs will drive the product manufacturing requirements.

This sounds simple and perhaps even virtuous. However, it is not only a fundamental change for the traditionally engineering-driven Digital, it is also, as far as we can tell, a unique IT industry business model. Among all of the numerous vendor reorganiza-

(Continued, p. 4)

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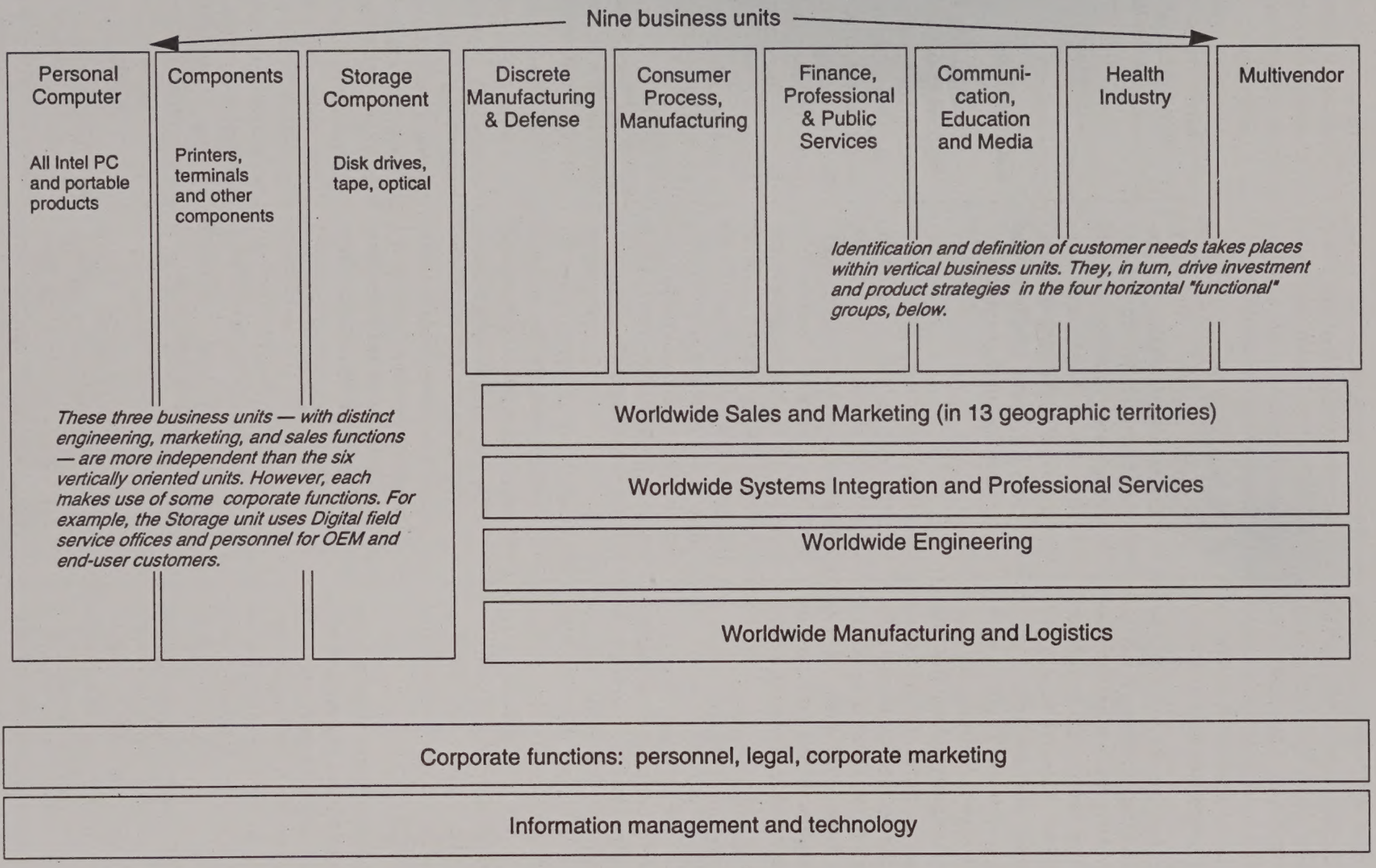
Digital Equipment Corporation's Organizational Structure, 1993



Source: Digital Equipment and IDC, 1993

tions of the last few years, no other major successful product company (IBM, HP, Sun, Apple, the Japanese, etc.) has opted for a structure with so little direct accountability for its core hardware and software competencies.

As for the second dis-integrated Digital, in theory it has the greater long-term opportunities in an increasingly dis-integrated IT industry. Nevertheless, given that integrated systems remain the biggest part of Digital's business, it may not always be easy for the company to keep this crucial fact in mind. Digital must resist the temptation to allow its strategy to be dictated by its installed base. Over time, its best and brightest must take part in the growth side of the industry.

In addition, we have the following specific concerns:

- **Alpha support.** Since the industry marketing groups are supposed to sell what the customer wants, they have no inherent stake in Alpha's success. For all the focus on accountability, the $500 million Alpha project has neither P&L status nor direct control over its own fate.
- **Software and networking void.** Under the new structure, Digital's software work still seems to be largely captive in nature; no software business unit is charged with selling Digital software in the open market. This will make it difficult to maximize Digital's notable strengths and investments in a potentially high-growth area.

  Similar issues exist for networking. The internetworking business promises to be strong throughout the 1990s. To have the bulk of this activity located within the integrated systems side of the house would be a mistake.
- **Product bias.** By setting up its industry services structure, Digital will inevitably be compared to EDS, which is organized along similar lines. In such comparisons, the company will be vulnerable to criticism for being overly biased toward in-house products.

Since the industry groups control the Alpha sales channels, Digital's sales force will likely maintain a strong preference for Digital products, a fact almost certain to be reflected in its sales commission structures. However, IDC believes that a strong in-house product orientation will be more a hinderance than a help to the successful services companies of the 1990s. Digital clearly believes otherwise.

- **Services quality.** By organizing itself around industry sectors, Digital is betting heavily on its ability to solve real customer problems. We believe the company needs to quickly improve its knowledge of customer applications to effectively compete with companies such as EDS and Andersen. Historically, the industry marketing groups have not been the strongest part of Digital; now they must become so.
- **Autonomous success.** Within the second, dis-integrated Digital, the key groups (PCs, Storage, etc.) are still highly dependent on current Digital customers. Successful long term autonomy will require a much more diversified customer base. Although the company is progressing, succeeding in these highly competitive areas will require a major cultural transformation. Fortunately, Bob Palmer, with his semiconductor background, has a deep understanding of this issue.

Conclusions

Recognizing that all organizational structures involve substantial trade-offs, we believe that the current Digital approach is a manageable first step that will help the company deal with some of its most pressing financial problems. It also represents an interesting attempt to develop a framework for dealing with both legacy systems and emerging opportunities.

Our concerns are less with 1993 than with the 1994-95 time frame. Here we offer two scenarios.

If the Alpha products are very successful, cooperation between the Alpha product and industry groups will continue, enabling this organizational structure to stay intact. Over time, additional autonomous business units might generate significant future growth in emerging areas (such as wireless computing) in which Digital is currently not participating. A good balance between integrated systems and dis-integrated products and services could evolve.

On the other hand, if Alpha (be it with VMS, Unix, or NT) does not drive the business, a major rift between the Alpha and industry groups will almost cer-

tainly develop and further restructuring will become likely. In all probability, the direction of any such changes will be along the lines of the more radical product and services separation now being undertaken by IBM. Unfortunately for Digital, IDC currently believes that this latter scenario is more likely to develop.

Given this crucial role for Alpha, the lack of direct P&L accountability for its success is troubling. Robert Palmer responds that the ultimate Alpha accountability rests with him. Since for the next two years nothing will be more important to Digital's future, perhaps this is as it should be.

However, Digital should recognize that it has opted for evolution, not radical restructuring. The potential reward is a relatively smooth passage through these turbulent times. The risk is that critical Digital technology (i.e., Alpha) may be hampered by over- reliance on a largely captive, vertically integrated structure. If this proves true, more radical changes will not be avoided but merely delayed, and in today's highly competitive and unforgiving industry, the consequences of such delays can be severe.

The New IBM: Action Along with Talk, But Can It Really Change?

Based upon presentations at IBM's recent Consultant and Computer Services Conference, IBMers are talking up a new, hard-nosed view of the company and of the IT business. Not surprisingly, much of the talk has to do with change.

How does it translate into action? Some of the results are now coming clear. To no one's surprise, the new IBM is a leaner, decentralized organization. Approximately 100,000 employees have left the company over the last year. Another 25,000 are expected to leave this year. Layers of management have been reduced from seven to four.

The new IBM is still cash rich, and is getting richer. Exclusive of the extraordinary restructuring expenses, IBM remains a highly profitable business with close to $5 billion cash in the bank. Its 1992 net income before taxes of $2.6 billion was more than that of all major Japanese and European competitors combined.

The new IBM is (almost) a software and services business. Non-hardware revenue in 1992 accounted for 48% of total revenue, up 12% from 1990.

Top financial managers in the company cite four critical success factors: executing on the new efficiency-based model, acquiring/leveraging services skills, dominating in distributed computing, and solving technology and manufacturing affordability issues (i.e., changing the company's financial profile). These do indeed represent a new view of the computer industry.

IBM Large Systems

No IBM business unit will undergo as much change in the coming months as the Large Systems LOB. To that end, IBM has assumed a humbler and more realistic mainframe mission statement. Today, the overall theme is "serving new expectations" — basically becoming anything its client base (what's left of it) wants. Enterprise Systems management recognizes the need for adopting end-user perspectives, although ES has historically been far removed from this group.

IBM's mainframe group identifies three areas of strategic focus: a commitment to open computing (adherence to standards, interoperability, and portability), recognition of user demand for client/server computing (where central systems take on a smaller, though not necessarily less important, function), and the new economics of computing — microprocessor-based hardware solutions.

To engineer this massive transformation, IBM has had to be completely honest and forthright. It has also had to adjust some messages it has been giving customers for years. IBM has laid out an aggressive large-systems products strategy that refutes much of what the company has been telling its customers for

years. No, it turns out, the mainframe is not a cure all. No, IBM now says, the mainframe is not immune to the technological substitution that has been rampant in the industry for years.

IBM is quickly bringing the mainframe cost structure into the microprocessor world. It is planning a major transition for S/390 systems and customers to parallelism and CMOS microprocessors. It expects to have applications move over transparently to new platform. The new CMOS-based systems will be moderately parallel (anywhere from eight to hundreds of boxes linked together).

The first product—a parallel query box — will be available in the second half of 1993. Both OLTP and CICS will be available on this platform in 1994. Eventually, IBM feels, the family of S/390 products will be made up of thousands of microprocessors.

IBM Personal Systems

IBM appears to be making steady progress in its efforts to make the former PS line of business a hungrier standalone organization. Executives from the PC Co. report, for example, that product management teams own the authority and responsibility to match competitors' price cuts. Experience bears this out. When Compaq cut prices late in the week, the PC Co. responded within 24 hours.

The IBM PC Company

IBM's most autonomous new unit crowed long and hard about its regained competitiveness in the PC business. The IBM PC Co. sold more PCs in the fourth quarter of 1992 than in any previous quarter and regained its leadership position in worldwide unit shipments.

Much of the decision-making responsibility in the PC Co. has been delegated to the four brand teams that manage the company's PC lines. Some highlights of future product releases:

- **PS/2:** Continued focus on services and warranty; fault tolerance will move up and down the PS/2 line; built-in PCMCIA adapters.
- **ValuePoint:** Continued focus on affordability and preloaded systems; video capabilities; six-month development cycles.
- **PS/1:** continued focus on ease of use and affordability; continue channel expansion (IBM increased its presence in retail channels from 5% to 25% of all outlets by opening 6,000 new outlets in the U.S. in 1992, and 8,500 worldwide).
- **ThinkPad:** continued focus on portability, PCMCIA cards, and pen interface.

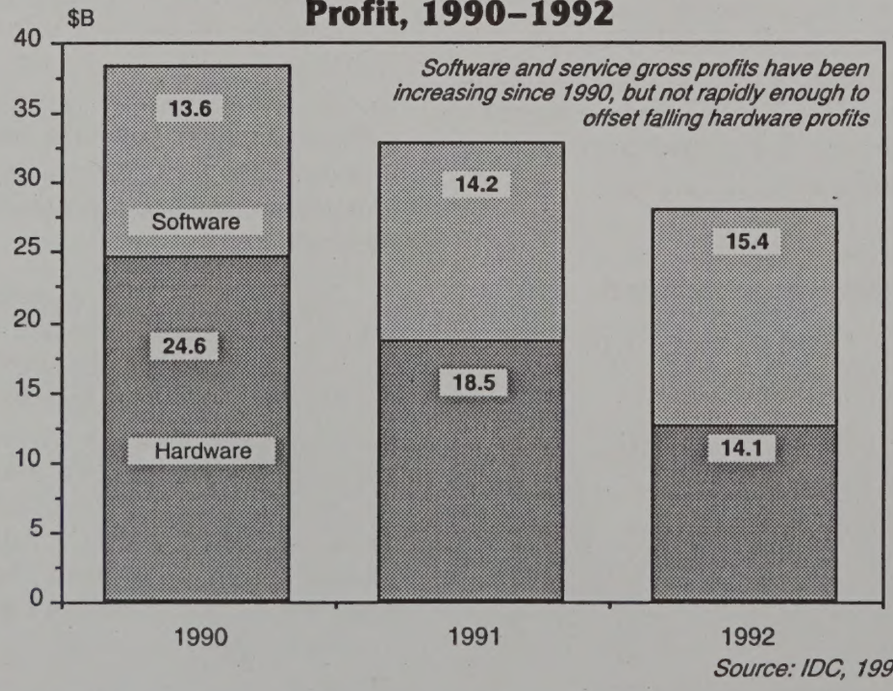
RS/6000

IBM's RS/6000 architecture has become a very important asset. It already scales from large and midrange systems to desktops. It is widely hailed as the future of IBM's enterprisewide computing strategy. Despite that success, the RS/6000 remains, at $2 billion, a small part of IBM. It is only the third best selling RISC architecture in the industry.

Already IBM claims that RS/6000 sales are split 50/50 between commercial and technical applications, and efforts to commercialize the RS/6000 business continue. IBM expects transition processing tools Encina and CICS to port to AIX on DCE in 1993.

If RS/6000 is the future of IBM, the future of much of the RS/6000 is the Power PC. PowerPC 601 systems will ship in volume in 3Q93. Its performance will be roughly similar to that of Intel's Pentium chip. However, the 601 PowerPC will be less ex-

IBM Hardware and Software Gross Profit, 1990–1992



Source: IDC, 1993

pensive, smaller, and it will consume less power. Other systems, the 603, 604, and 620, will reach volume shipments in 1Q94.

OS/2 and Taligent

IBM's operating system strategy is a balance of here-today OS/2 and promised-for-tomorrow Taligent. How does IBM differentiate between the two? Delicately. According to IBM, if customers can afford to wait a year to begin writing a major new application, they should. Otherwise OS/2 offers, IBM feels, the most robust PC OS in the business.

OS/2 is currently shipping 200,000 copies per month. The stick rate (at which preloaded OS/2 remains in use on PC systems sold by IBM and its partners) is, at 75%, comparable to that of other operating systems. It counts 75 OEM partners shipping OS/2, and over 1,200 OS/2 applications are currently available.

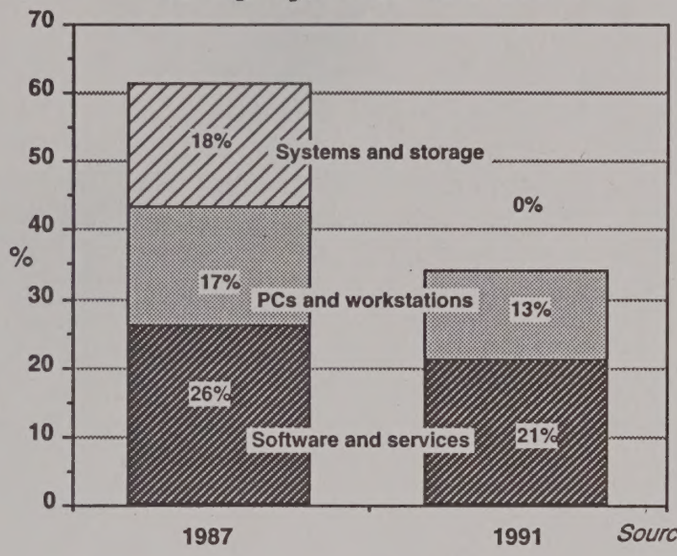
While Taligent is so far a pleasant surprise, it is still a long way from finished. Taligent developer kits will be available next spring, and portable environment will be available by yearend 1994.

Taligent has a 12–18 month advantage over other object-based OS suppliers — most notably Microsoft. Microsoft will release NT sometime this year and has unofficially announced it will be followed up by a truly object-based operating system (Cairo) in as little as two years. That's a fast transition, even for Microsoft.

Midrange Systems: AS/400

Much of the industry is focused upon Unix, NT, and the incipient battle for midrange market share. Meanwhile, IBM's AS/400 continues to thrive with a single clear goal: to deliver inexpensive and well-integrated solutions that absolutely reduce customer risk, switching costs, and the cost of computing.

IBM Major Business Segments' Return on Equity, 1987 and 1991



Source: IDC, 1993

Small business accounts for 36% of shipments. Intermediate-sized customers account for 37% of installations. Large customers downsizing accounts for 3% of shipments and 15% of revenue. This business is growing quickly. Customers buying multiple systems to tie together to networks account for 25% of AS/400 business. IBM has 200,000 AS/400s installed worldwide. It installed 60,000 last year, 10,000 of which were upgrades.

IBM's ABS (Application Business Systems – the group responsible for the AS/400) did relatively well in 1992. Revenue was up 3% in the US, but total revenue was down 2% worldwide due to the European slowdown.

AS/400 Future Strategy

IBM's AS/400 mission is to deliver the world's fastest commercial applications platform. ABS is investing over $500 million annually in AS/400 R&D; other IBM groups collectively contribute roughly the same amount. ABS has four guiding goals: to deliver best value, to deliver an open product, to make the AS/400 the system of choice for software developers, and to make it the highest-quality product in the marketplace.

IBM will deliver a full RISC implementation of the AS/400 in a few years because a 64-bit addressing scheme is already included on AS/400s today. Current RISC technology is only 32-bit addressing. Although RISC will soon employ 64-bit addressing, it is not yet available.

The reason for the delay according to ABS is customer protection. ABS wants to make upgrading AS/400s as easy as possible. So it will announce RISC AS/400s only when it can deliver them working out of the box with current operating systems. That way customers can field-upgrade AS/400s and protect their serial number to minimize transition pains and costs.

IBM's Biggest Challenge Is to Regain Industry Leadership — That Means the Emerging Market for Distributed Computing

IBM's next CEO has at least one really big decision to make. In articulating a new corporate vision for IBM the options seem clear: a vision based on better management of IBM's traditional businesses, or one that realigns the entire organization around a new principle—distributed computing leadership.

Proponents of the first option see a bunch of loosely knit and moderately profitable companies managed by the principles appropriate to each distinct business model. This is a wise strategy for increasing the effectiveness of many of those individual business units. But not for the IBM Corporation.

Despite a great deal of industry conjecture, this "federation of companies" scenario is highly unlikely. Under it IBM would pay much higher taxes. And it would require massive worldwide reorganization to comply with different international laws restricting ownership of the new companies.

The second option is much more in line with IBM's traditional values. Yet it relies on technologies and expertise that stretch the company's current strategies. IBM's long-term mantra should be "distributed computing leadership."

Like every computer company, IBM faces a host of technological and marketing challenges if it is to remain competitive. But unlike some of its competitors, IBM's most daunting challenge is to reconstruct its financial management strategy — not just its businesses — around the new cost-of-computing dynamics of the smaller systems it will be selling more of in the future. IBM knows that selling mainframes is no longer a luxury.

In fact, it knew that a long time ago. It just wasn't sure *when* PCs would become powerful enough and inexpensive enough to render mainframe price/performance completely noncompetitive. That happened last year. Customers are no longer willing or able to justify mainframe MIPS that cost up to 1,000 times the price of PC MIPS.

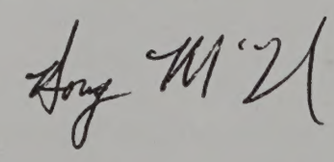
Even as IBM toed the waters with what is now an almost $10 billion PC business, it continued to avoid recognizing that imminent fact. It continued its mainframe binge. The sweet nectar of 40% gross margins was too tempting. Having tasted them during the '60s and '70s, the company could not discipline itself to go back in the '80s. It could not convince enough of itself that the party was almost over.

Has IBM sold its large-systems customers a bill of goods? No. Could it have been more honest? Sure. But much of IBM really believed in the mainframe. The company has only recently looked at distributed computing as more than a passing fad. It has only recently begun to admit it was wrong. Acknowledging the problem is the first step. Progress from that point is measured in neither good intentions nor promises but sustained action.

Either of the two plans will require sacrifices. Some IBMers may desire only the federation-of-companies approach, because it seems to promise decent results with a minimal amount of pain. They might feel that the other approach by comparison will ask too much of them. Inertia is on the side of the less ambitious plan.

But the time is now for IBM to embrace a new charter. It is like a hungover reveler. Giddy from years of 40% margins, it became soft and vulnerable. Now, it has seen the errors of its ways. It knows it must change.

IBM has the germ of a very good plan. The message could be still clearer and stronger that it has truly changed. Organizing IBM around the guiding principle of dominating the distributed computing business, not just making the big old company more efficient, is precisely the strategy and message needed.



THE GRAY SHEET
Computer Industry REPORT

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Going on the Offensive: Prospects for U.S. Companies in Japan

While much of the U.S. political establishment focuses on a perceived decline in overall U.S. technological competitiveness, the information technology business is revealing a different story.

Over the last few years, U.S. companies have not only halted foreign (read Japanese) inroads into the U.S. IT industry, they have now clearly gone on the offensive. Symbolically, Intel is now the world's largest semiconductor company. Perhaps even more tellingly, a wide variety of U.S. IT companies have ambitious plans for the Japanese domestic market, once considered to be an impregnable fortress.

Why has all this happened? And—perhaps more important—how real and sustainable is the actual opportunity?

Recently, much has been written about the speed and effectiveness of highly focused U.S. PC hardware, semiconductor, software, peripheral, and networking companies and the powerful synergies that now exist between these companies' U.S. design operations. What has received less attention is the role played by the strategies and structures within the Japanese IT industry itself.

In this issue of the Gray Sheet we look at the global competitiveness issue from a Japanese perspective. We will show that many of the Japanese vendor problems stem from unusual rigidities in the Japanese domestic market. Understanding the likely evolution of these rigidities provides the key to developing a realistic assessment of both the long- and short-term opportunity in Japan as well as the worldwide prospects of the wounded but still formidable Japanese suppliers.

IN THIS ISSUE:

U.S. Companies in Japan 1
Demand Conditions 2
Origins of Opportunity 3
Domestic Rivalry 3
U.S. and Japanese Markets 4
Short Term Opportunity 4
Differences Between U.S. and Japanese Markets 5
Outlook for Japanese Vendors 6
Opportunities for U.S. Companies in Japan 6
Restoring the Diamond 7
IBM's New Chief 8

An Academic Perspective on Global Competition

In his book, *The Competitive Advantage of Nations*, Michael Porter details how a nation's success in a global market nearly always requires a vibrant and competitive domestic marketplace.

More specifically, Porter has developed a model that identifies a set of mutually reinforcing traits that characterize global leaders across a wide variety of industries. Porter's so-called "diamond" (see chart, p. 3)

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is a useful tool with which to examine the Japanese IT position. Porter focuses on four main issues, which are briefly defined below:

1. **Factor conditions.** Basic factors of production: skilled labor, available capital, necessary infrastructure, etc.
2. **Related and supporting industries.** The presence of an internationally competitive supplier structure in key related industries.
3. **Demand conditions.** The sophistication of the domestic market demand for the industry's product or service.
4. **Firm strategy, structure, and rivalry.** The manner in which companies are created, organized, and managed, and the intensity of the domestic rivalry.*

Applying this scheme to the Japanese IT situation, we see that at least for hardware markets the Japanese have been well positioned in areas 1 and 2. They have strong engineering and manufacturing skills, as well as ample capital resources and a leadership position in key related industries — consumer electronics, power supplies, media, and robotics for example.

However, significant problems exist in both areas 3 and 4. The issues relating to local demand conditions are relatively well known and will be reviewed briefly. The main — and less widely understood — concern is the lack of true domestic rivalry (to be discussed in more detail). Combined, these two factors have created a domestic situation that has left Japanese suppliers ill-prepared for today's global IT industry competition.

Demand Conditions

The charts on pages four and five highlight some of the major differences between the U.S. and Japanese domestic markets.

The first looks at the overall market composition and shows that compared to the U.S., the Japanese domestic market is much more reliant on minis, mainframes, and custom software. Conversely, there is considerably less emphasis on the major worldwide growth areas of PCs, networking, and packaged software.

The second draws on customer data from IDC's 1993 Global IT Survey. Here also is a pattern of bias toward older technologies and modes of computing. Specifically, Japanese IT customers are less interested in client/server architectures, open systems, Unix, downsizing, LANs, and MS-Windows. Thus, Japanese vendors have not had to face these issues to the same extent as their U.S. rivals.

In addition, the sophistication of Japanese domestic demand is also diminished by cultural factors, including Keiretsu-based customer relations, an educational bias toward hardware, conservative business practices, and the Japanese language itself.

The Keiretsu system, in which groups of major companies have interlocking financial interests and tend to support each other's products, is often viewed (correctly) as a strength in terms of keeping out U.S. rivals. But often not mentioned is the fact that this same system also tends to limit the intensity of competition between the Japanese vendors themselves.

Additionally, a hierarchical business culture, lack of packaged software, and the fundamental difficulties of computing in the Japanese character-based language have greatly restricted the overall extent of end-user computing.

In short, for major sectors such as PCs, packaged software, and networking, the Japanese market has for a variety of substantive reasons lagged the rest of the world, diminishing the base of experience of Japanese suppliers, and making their worldwide export strategies that much more difficult.

**Michael Porter, The Competitive Advantage of Nations (New York: The Free Press, 1990), 72.*

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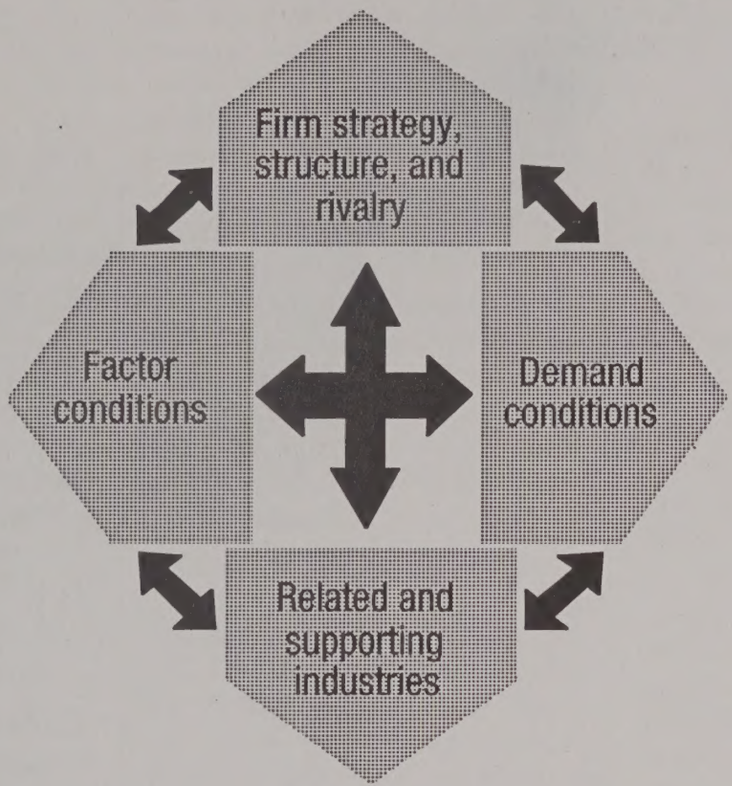
Origins of Opportunity: A Textbook Perspective



Source: The Competitive Advantage of Nations, and International Data Corporation, 1993

Domestic Rivalry

Our statement that the lack of sufficient domestic rivalry is a problem for Japanese vendors may come as a surprise to many — possibly including the major Japanese vendors themselves.

After all, these companies see themselves as fierce rivals, constantly jockeying for leadership positions. Additionally, the intense Japanese domestic competition that led to worldwide leadership in automobiles, consumer electronics, and even DRAMs are textbook examples of Porter's diamond at work.

But it is important to keep in mind that the issue is not the extent of perceived rivalry, but rather whether the competition in Japan is as intense as it is in competitive countries (i.e., the United States), and here the answer has been a clear no.

Personal computers are the most important example. For years, many participants and observers noting the apparent similarities to the consumer electronics business expected the Japanese to be major players in the worldwide PC business.

Obviously, this has not happened, and the lack of sufficient domestic PC competition has been a primary, but often unrecognized, reason. In general, the industry has greatly underestimated the impact of the lack of a true DOS standard in Japan, which has led to a structurally less efficient Japanese PC industry.

(For those unfamiliar with this issue, the entire history of the Japanese PC market has been much like the first few years of the U.S. market. Each PC vendor has produced its own version of DOS that was incompatible with all the other vendors. Only now with the movement to a common DOS/V format is this situation starting to change.)

The lack of true PC standards resulted in the following domestic market conditions:

- **Higher prices.** Since there was little direct competition, and significant customer lock-in, product prices have been far higher than world levels.
- **Less innovation.** With each vendor creating its own machine, the pace of innovation has been slowed due to a not-invented-here syndrome as well as a lack of compatibil-

ity with new software, peripheral, and semiconductor technologies designed around the worldwide DOS standard.

- **More difficult migration.** The multitude of incompatible PC architectures has greatly complicated the movement towards advanced platforms such as Windows, LANs, and WANs.
- **Single-vendor control.** NEC has had roughly 50% of the market, setting the pace of change, providing a price umbrella, and making substantial profits.

In short, the historical structure of the Japanese PC industry resembles nothing so much as the U.S. minicomputer industry, with multiple incompatible architectures that give vendors a significant amount of customer control and hence price stability. We leave it to industry historians to debate whether the U.S. PC industry would have a similar structure had not IBM decided to open its PC architecture. IBM, no doubt, must wonder the same.

The PC business is typical of most of the Japanese local market with vendor proprietary systems holding a tight grip on the vast majority of sales. The Keiretsu culture and Japanese language issues are a big part of this, but a bigger reason, and another aspect of the missing rivalry issue, is the lack of start-ups.

Consider the question of where the U.S. Unix market would be today were it not for start-ups such as Sun, Pyramid, Convex, Silicon Graphics, and Sequent, let alone early pioneers such as Altos, Plexus, Onyx, Synapse, Auragen, et al.

Successful or not, the spur of these new companies was necessary to break the hold of the established proprietary vendors and to usher in the open systems business of today. However, no such start-up push has ever existed in Japan, and thus the Japanese Unix market today is largely restricted to the workstation business, giving major Japanese vendors little direct experience in building, selling, and supporting Unix-based systems.

In sum, the domestic market has allowed Japanese vendors to enjoy relatively protected competition in many key hardware markets. This protected environment coupled with the lack of start-up activity has made it easy for them not to make the changes necessary to take advantage of emerging worldwide opportunities.

Now, in addition to these troubles outside of Japan, worldwide market forces are finally coming to the Japanese domestic market itself, putting the major Japanese suppliers on the defensive for the first time since the IBM/Fujitsu/Hitachi mainframe software suits of the early 1980s.

Assessing the Short-Term Opportunity

Confident of their position in the home market, U.S. vendors have clearly sensed an opportunity within Japan itself. Indeed, not since the 1960s have so many U.S. companies (Microsoft, Compaq, Novell, Apple, Dell,

Composition of U.S. and Japanese Domestic Markets by Sector, 1992

	Percent of U.S. Market	Percent of Japanese Market
PCs/workstations	24%	19%
Multi-user systems	18%	29%
Datacomm equipment	5%	2%
Hardware subtotal	47%	50%
Packaged software	18%	10%
Support and professional services	35%	40%
Total	100%	100%

Source: IDC, 1993

Key Differences between U.S. and Japanese Domestic Markets

	U.S.	Japan
Percent pursuing client/server	43%	26%
Percent pursuing open systems	51%	24%
Percent pursuing Unix strategy	34%	17%
Percent downsizing	34%	29%
Percent of PCs on LAN	37%	23%
Percent of PCs running Windows	38%	5%

Source: IDC, 1993

Informix, Cisco, EDS, and others) spoken so openly about their prospects for success in what is easily the world's second largest IT market. How real is the opportunity?

The chart on page six is IDC's view of the relative attractiveness of each layer of the industry value chain over the 1993–94 period. In addition to this overall assessment, we would make the following observations:

- **Services.** Given the people-intensive nature of this business, it is difficult to develop and sustain advantages over local players. With the exception of services sold to U.S. companies operating in Japan, we have modest expectations.
- **Channels.** Similar in nature to services with the exception that Japan's use of vertically integrated channels (e.g., an NEC store) is likely to be vulnerable to new approaches from a Compaq or Dell, at least in the short run.
- **Software.** Here the opportunity is virtually unbounded, with a largely untapped market coupled with weak local competition. Excellent prospects exist for PC and LAN software of all sorts as well as networking and relational database products. U.S. companies should price aggressively to maintain their long-term position.
- **Datacommunications.** Good short-term prospects for LAN hardware makers such as Cisco and Wellfleet due to lack of developed competition and an expected take-off of the still small Japanese LAN market.
- **Personal computers.** U.S. vendors have already forced significant changes in Japanese PC pricing, but the major Japanese PC players can be expected to respond (and if necessary temporarily lose money) in order to hold market share. U.S. vendors will be very aggressive (we can even imagine Japanese vendors voicing a dumping complaint or two), but overall market share gains will probably be modest. The actions of IBM, Compaq, and Dell will serve as a much needed wake-up call.
- **Workstations.** Toshiba's recent decision to OEM the full range of Sun server products was a big step toward bringing modern open systems technology to Japan, but long term the Japanese vendors have every intention of taking back the domestic part of their workstation business, and their control over the key channels gives them the luxury of time.
- **Semiconductors.** Japan's overreliance on DRAMs as opposed to more specialized, design-intensive chips has rightly received a lot of attention, but the main issue has been and will continue to be microprocessors.

Nothing must irk Japan's IT leaders more than paying such large sums of money to Intel. In the late 1980s and early 1990s, Japan hoped to change this by aggressively backing any and all serious MPU alternatives — its own TRON technology, as well as new U.S. RISC chips, Sparc (Fujitsu/Toshiba), MIPS (NEC), HPPA (Hitachi).

Now that it appears that Intel has at least temporarily held off the RISC challenge, one can expect the Japanese to try to move into Intel-compatible markets in what must seem to them to be a step back into a PCM future. The Fujitsu/Advanced Micro Devices deal may prove to be an important first step just as Fujitsu/Amdahl was in the late 1970s.

Outlook for Japanese Vendors

Given the relatively attractive short-term opportunities for U.S. suppliers, the key question is to what extent the Japanese vendors can recover and what this implies regarding both the long-term prospects for U.S. companies in Japan and the competitiveness of Japanese companies worldwide.

A recent *New York Times* story (February 23) expressed much of the prevailing sentiment: that Japanese companies have spent 30 years following IBM's lead, and unfortunately for them they might follow IBM right over the edge of a cliff.

There is both truth and exaggeration in this, but the near-term future of the major Japanese vendors — although likely to be very tough — is unlikely to be as wrenching as that of an IBM or Digital.

It is certainly true that standardized PCs, LANs, and open systems are coming to Japan, and that the Japanese vendors are not yet well positioned. It is also true that certain companies, particularly Fujitsu and Hitachi, are far too dependent on the declining mainframe business.

But there are several reasons why the impact won't be as severe:

1. In the Japanese domestic market, because of the still-weak position of U.S. and start-up companies, the infusion of open systems technology will be slower, giving the major Japanese vendors more time to adjust. Also, diversified companies like Toshiba, NEC, and Hitachi are unlikely to allow short-term setbacks to force a retreat from important IT business goals. Japanese companies have often surprised the world with their ability to adapt to major changes in business conditions, as with OPEC in the 1970s and the rise of the yen.
2. Outside Japan, Japanese vendor business is largely of an OEM nature. Thus even if Japanese mainframe OEM business to Amdahl (Fujitsu), Comparex (Hitachi), HDS (Hitachi), and Bull (NEC) declines, Japanese companies do not have large service and support structures that would have to be cut back. Contrast this with the massive cutbacks that IBM is making in many countries around the world.
3. Unlike IBM's and Digital's,

Key Areas of Opportunity for U.S. Companies in Japan

	1993-1995
Professional services	=
Distribution channels	=
Application software	+
Systems software & tools	+
Peripherals	=
Datacomm equipment	+
PCs	=
Workstations	=
Minis/mainframes	
Semiconductors	+

+ Strong = Average – Weak

Source: IDC, 1993

the existing Japanese worldwide business model is fundamentally sound. Japanese vendors' problems have been due to the effects of their local environment and some significant strategic mistakes, not the business model itself.

This last statement is the most important and perhaps the most controversial.

IDC's overall view of industry dis-integration describes how the vertically integrated structures of IBM, Digital, and others have become obsolete in a world where competition takes place at each stage of the value chain (see The Restructuring of the Information Technology Industry, 1990–2000, IDC #6571, May 1992).

On page 6 of that bulletin we pointed out that although the Japanese are often described as vertically integrated, no such business model overhaul is required because the Japanese have always used the sort of autonomous business unit or company-within-a-company structures that IBM and Digital are only now adopting.

More specifically, unlike IBM and Digital, the semiconductor, disk-drive, and other groups in Japanese companies were never set up to serve purely captive purposes. Consequently, these companies have considerable experience in OEM markets and should not require any major organizational changes.

In short, the Japanese vendors' challenge is to restore the vitality of their current business model rather than strive to find a new one. As we shall see, despite some substantial immediate problems, their long-term prospects for so doing are reasonably good.

Restoring the Diamond

We believe that over the 1993–95 period, many of the troublesome domestic rigidities will be alleviated, and that conditions will be created for long-term Japanese vendor recovery in key hardware markets. Specifically, by mid-decade we would expectthe following:

- A true PC standard to be dominant and supported by virtually all vendors, including NEC.
- Unix and LAN usage that closely resembles worldwide trends.
- Normalization of Japanese and world IT prices.
- Initial Japanese successes as Intel-compatible MPU and PC manufacturers.
- Improved payoffs from global joint ventures with Apple, IBM, AT&T, and others.
- Initial benefits from the convergence of IT and consumer electronics, along with continued strength in laptops and hand-held devices.

As these circumstances develop, it will become much easier for Japanese vendor core competence in low-cost manufacturing, R&D, miniaturization, and quality to be productively engaged, and for Japanese vendors to once again become formidable global players at many levels of the value chain. However, this recovery will be limited to hardware sectors, because the Japanese position in worldwide software and services markets is likely to remain quite weak.

This expected recovery can be achieved without Japanese start-ups and without major structural changes. Whether it can also be achieved without violating no-layoff practices is much more doubtful.

In the long term, the U.S. vendor hardware opportunities in Japan are not nearly as attractive as those in software; there will certainly be hardware successes, but Japanese competition will strengthen significantly in the second half of this decade.

Whereas restructuring is clearly the watchword for IBM and Digital, for the Japanese the issue is more one of retrenchment, retooling, and recovery.

Over the last few years, U.S. companies have not only halted foreign (read Japanese) inroads into the U.S. IT industry, they have now clearly gone on the offensive.

IBM's New Chief: Timing is on His Side

Lou Gerstner — thumbs up or down?

Optimists point to his track record. Gerstner spent 13 years at McKinsey, 11 at American Express, and four at RJR. At each company he was charged with planning and executing significant changes. If remissioning and reforming is what IBM needs, then Gerstner is the man.

But history can be double edged. Since his departure American Express has suffered through three years of lackluster performance. Further, RJR is in trouble. Beyond selling assets to shore up the balance sheet, Gerstner appears not to have addressed RJR's biggest problem.

RJR is addicted to tobacco-product margins the same way IBM is hooked on mainframe margins. Gerstner could not remedy the addiction. With tobacco profits off, RJR's stock is in the tank. To his credit, Gerstner did pay down $6 billion in debt, and he did make the RJR/Nabisco merger work better than anyone thought he might.

Contrarians, however, do not see enough good in his track record. They point out that he has little understanding of the intricacies of the IT industry and fear he will chop needlessly, or that he may not grasp the nature of a non-consumer business. They remain unconvinced of his ability to affect long-term change at IBM.

There is little rational need for Gerstner to understand the underpinnings of IBM's technology. It will not be his biggest problem. He can grasp enough of the understanding of industry dynamics in a single weekend (with a good newsletter ...). His job is portfolio management, not technology.

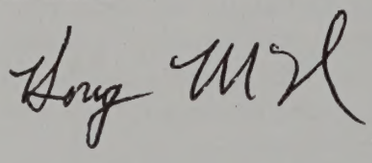
Gerstner has several key advantages when it comes to paring down IBM. His track record indicates that he is a master tactician. Good. IBM needs not to cut for cutting's sake. Nor does it need to shed business units just to shed. It needs a brilliant organizational structure. There he has proven skills.

As far as the long-term implications of his management are concerned, it seems highly unlikely that Gerstner will be at IBM for more than three years. For that duration he will provide exactly what the company needs, and no more: a brilliant strategist, organizer and implementer. He would not be happy running a healthy IBM. A healthy IBM would not be happy with him at the helm.

One of the most important parts of knowing when to get out is knowing when to get in. Gerstner is a gambler, but not a fool. Right now people don't expect much from IBM, and the stock is at an all time low. Based on asset value alone, the up-side potential for IBM's stock is better than the possibility that it will decline further.

Gerstner is counting on a little organizational magic and a kick in the pants. While it is certainly possible that IBM will do a Wang, it seems far likelier that the stock will have increased from its current $54 plateau when he's ready to leave IBM in three years.

Besides, despite their shortcomings, mainframes have something on tobacco products. No matter how vicious the competition from within the computer industry, it seems unlikely the first lady will ever wage war on them.



THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | APRIL 16, 1993 | VOL. 28, NO. 11-12 | Published continuously since 1964.

3DO and General Magic Lead the Digital Media Way With New Business Models

New products from three companies — General Magic, 3DO and EO — are poised to stimulate a new era of expansion in the computer industry. All three companies are coordinating efforts in markets where traditional computer companies have failed miserably: information and communication businesses dominated by giant media and telecommunication companies.

They all face an uphill climb, but General Magic (GM) and 3DO are attempting to propagate new communication standards, and not just new products. The basic strategy: leverage the influence of well-placed and well-heeled partners and collaborators. Consider the following:

- **New models.** New business models form the cornerstone of each strategy. 3DO and GM plans to sell or license intellectual property around which customer partners will build hardware and software products for two of the least-tangible and most talked about potential new markets in the computer industry: advanced messaging (GM) and transaction-oriented home multimedia (3DO).
- **Major league partners.** Both companies have signed up an impressive list of computer-industry sponsors and partners. Creating an industry standard architecture takes more than a single company. Initially a single company could do it (S/370 or VAX, for example). More recently it has taken a single platform (IBM/Intel/Microsoft or Apple) and hundreds of ISVs. Future architectures will likely adopt the Novell everything-to-everything approach.
- **Non-IT partners.** Of perhaps even greater interest, however, is the degree to which both companies are conspiring with publishers and information services suppliers to build critical mass for their new architectures.

General Magic has developed a language called Telescript for creating communication-oriented applications — advanced electronic mail and wireless messaging. Telescript will be licensed to a host of systems and applications software suppliers. It will enable new applications to build in interactive messaging the way Macintosh enabled easy-to-use local networking.

3DO has designed specifications for a new hardware platform it calls the "interactive multiplayer." With RISC-based speed and advanced graphics manipulability, 3DO's device is like a VCR plugged into a Mac, all on steroids. 3DO merely sells licenses to build the

IN THIS ISSUE:

Digital Media and Computer Companies : New Standards and Architectures 1
Three New Platforms 3
Pieces of the Convergence 4
Computer Industry Companies: WOTS 4
Participation in the Information/Communication Industry Value Chain 5
Changes in Creating, Distributing and Displaying Information 6-7
The Revolution in Context 8-9
New Business Models: Standards and Disintegration 10-11
Publishers and Providers: WOTS 12
Broadcasters' WOTS 12
Telephone Carriers' WOTS 12
Cellular Carriers' WOTS 13
Consumer Electronics Manufacturers' WOTS 13
Cable Carriers' WOTS 13
Hobbit and ARM: Can they coexist? 14
Six Information Age Opportunity Markets 15
IT Industry's Prospects are Bounded by Those of Our Partners 16

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hardware, not the hardware itself.

EO has designed a personal communicator with built-in cellular telephone capabilities and many familiar personal productivity applications that rely on the pen interface. The hardware runs Go Corporation's PenPont operating system. For a more complete discussion of the EO platform see *the Gray Sheet* 28:4, December 1992.

Advanced Messaging from General Magic

General Magic has been constructed on the belief that new intelligent personal communicator technology will increasingly run communication-oriented applications. These applications will run on wired and wireless systems and will make use of **personal data** (names, addresses, last-contacted, about what, etc.) to **communicate** (managing/datakeeping different kinds of personal relationships) and share **knowledge** (information from and about the outside world).

The company has announced two product development efforts: Telescript and Magic Cap. Neither product is shipping today.

Telescript will operate on almost any kind of existing and new operating system. It is an OO-programming language used to specify how applications and components of applications will interoperate and communicate. Programs written on one kind of machine or system are transportable to another, greatly simplifying developers' work and allowing messages to specify what to do with objects that are being transported across the network.

MagicCap is a next-generation development environment that will be used to create graphical applications for handheld communicators and electronic assistants.

General Magic appears to have two goals. The first is defensive: to leapfrog Microsoft and provide a level of function that Windows can not — and maybe will not — provide. The second is more offensive: to stake out the messaging high ground and establish a new standard around which industry forces will coalesce. To achieve anything beyond very limited market acceptance, General Magic will remain focused on the second.

Consortia founded solely to weaken a dominant market player have generally met with limited success. The best example is the Open Software Foundation, which was an attempt to wrest control of Unix away from Sun. Recently, the OSF has backed off that strategy and narrowed its focus onto providing middleware, DCE.

3DO: Hope in the Nintendo Wars

The 3DO interactive multiplayer is a 32-bit RISC CPU, custom-graphics processor and operating system that can display and manipulate 64 million pixels per second. It offers software-based full-motion video based on SuperMac's CompactVideo compression technology, and hardware-based full motion MPEG-standard video from an add-in cartridge.

The system is designed to be expandable and open. Five multiplayers can be daisy chained together, and a variety of peripherals — custom controllers, memory, storage, input and output sources — can be attached. 3DO has targeted initial prices in the $700 range; the first hardware will be available in the fall of 1993 from Matsushita under the Panasonic brand name.

However, the unique nature of the 3DO business model and licensing arrangement may result in many different kinds of hardware implementations. 3DO is the licensing agent for the technology, but will not build hardware. It will continue only to develop the technology, which it will then provide to licensees.

3DO is fueling the development of titles also providing two types of software tools to developers. It has developed a series of special effects tools, called Cinematic Software Tools, which have been optimized for the 3DO platform. And it is providing licensees with a 111-gigabit library of multimedia movies, sounds and effects. The company's strong ties to Hollywood will likely assure it access to a continued stream of content.

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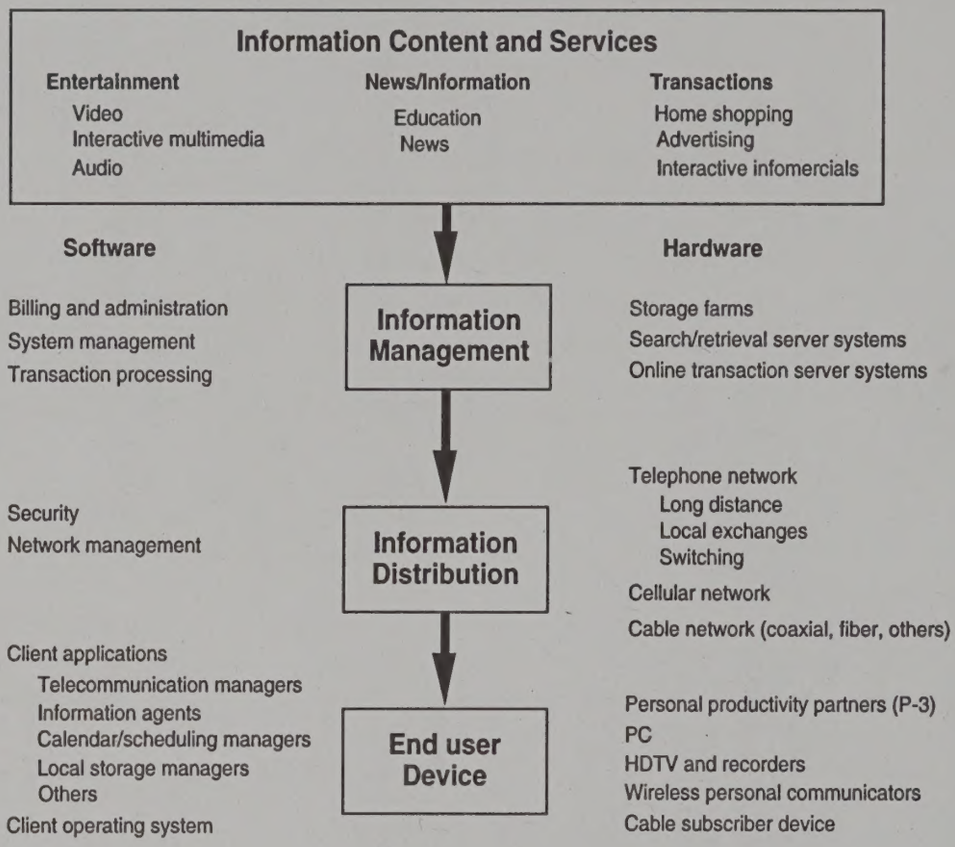
How the New Contenders are Building Value

	Microprocessor	System	Operating system	Applications	Distribution	Content
EO (AT&T)	AT&T Hobbit: 32-bit, low power RISC	EO; AT&T has announced it will resell EO hardware; seeking European partner	Go Corp.'s PenPoint in ROM	Telescript-based appls Personal productivity applications from Slate: notetakers, schedulers Custom applications for fleets, mobile workers	Cellular telephone and data transmission on high-end model	Easylink mailbox
Newton/ General Magic (Apple, AT&T, Matsushita, Motorola, Philips, Sony)	Advanced Risc Machines (ARM) 32-bit 610. Other ARM licensees for Newton: GEC-Plessey, Sharp, VLSI	Apple and Motorola will build handhelds based on Newton Compatible chipsets built by Cirrus Logic ASICs by LSI Logic	Newton OS Licensed by Kyushu Matsushita	Telescript-based applications focusing on personal information management and communication	Infrared and wireless data, NotePhone telephone/fax interface (with Siemens)	News/information from Motorola RF services and other wireless information sources
3DO (AT&T, Electronic Arts, Matsushita, MCA, Time/Warner)	32-bit ARM60 (a subset of ARM610)	Interactive multiplayer" built by AT&T and Matsushita, seeking other licensees	Multitasking firmware licensed by 3DO; "cinematic" software tools provided by 3DO	100 software licensees to date; focus on interactive graphics applications; 111 gigabyte library of multimedia content available on CD. With major Hollywood partners, 3DO's focus will be to build new interactive entertainment and educational software	Double-speed CD-ROM; cable TV distribution with next generation	Agreements with major studios ensure a steady supply of new material

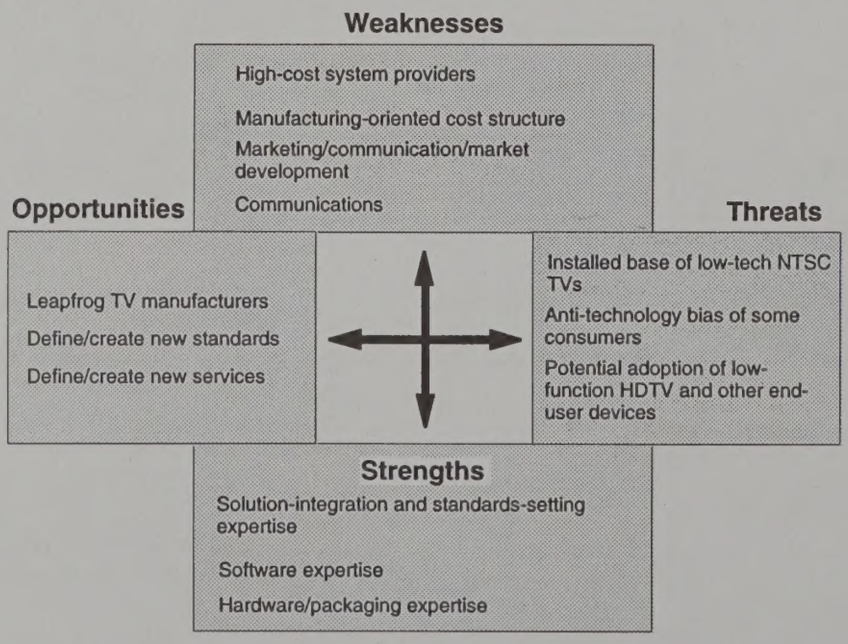
Source: IDC, 1993

Information On Ramps and Overpasses: Pieces of the Emerging Electronic Highway



The digital media infrastructure will involve a range of industries — publishing, transmission, information technology. Building it will involve expanding the functions of existing products — storage, communication hardware and PCs/P3s, for example, as well as building completely new products — such as copyright servers and client telecommunication billing managers.

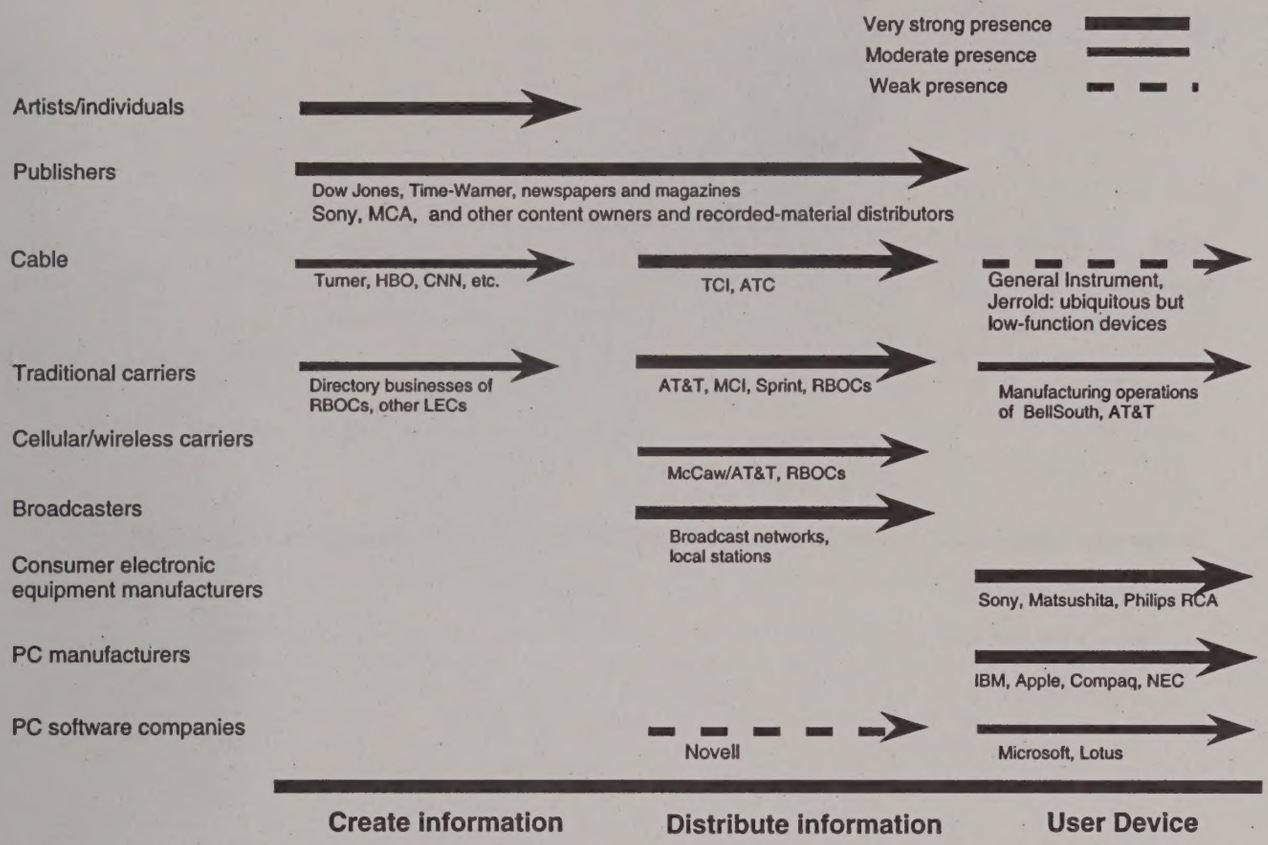
Computer Hardware: Competitive Position and Outlook



This chart highlights some of the computer industry's key advantages and opportunities (and weaknesses) as it contemplates competing in digital media markets. For analyses of other industry pieces, see pages 12-13.

Source: International Data Corporation, 1993

Digital Media: Vertical Integration, Standards and Demand



Few companies compete in every discrete sector of the communication industry value-chain. Telephone carriers, particularly AT&T, come closest. Their network services and equipment businesses are augmented by limited information publishing (yellow pages) and end-user hardware businesses. Some cable television carriers span the entire value chain, thanks to investments in programming providers and relationships with suppliers of limited-function end-user cable hardware.

Pre-divestiture AT&T's vertical integration was a great advantage — it allowed AT&T to set standards across critical interfaces (end-user-to-network, switch-to-switch, switch-to-transport, etc.). By owning and ensuring adherence to baseline standards, AT&T reduced the confusion of its potential new customers, therefore reducing their resistance to the new medium and boosting demand.

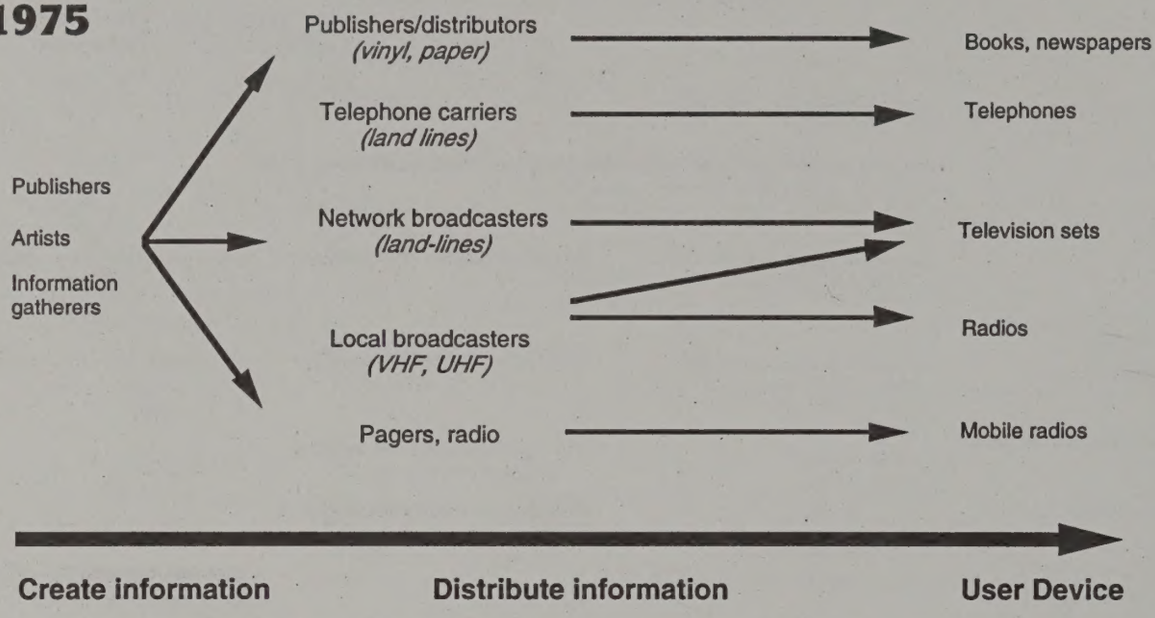
Can any single digital media company participate across the entire spectrum, from content/services to end-user devices? Probably not. No company has enough expertise (not to mention best-of-breed technology) in every different market sector. The problem is exacerbated by the distinctly different types of business models and competencies required at each stage of the chain. The net result is a high level of deal-making: alliances, consortia and joint ventures intended to bridge interfaces and, ultimately, drive demand.

Consumer acceptance of and demand for new-technology, digital-media products will be determined, at least in part, by the ease of use of the new standards. Already a great deal of frustration over incompatible multimedia CD formats (MPC, CD-I, and others) has dampened consumer enthusiasm. The competition to define and, potentially, exercise some ongoing control over new multimedia standards will remain a contentious area.

Source: International Data Corporation, 1993

Changes in Creating, Distributing and Displaying Information: Four Views

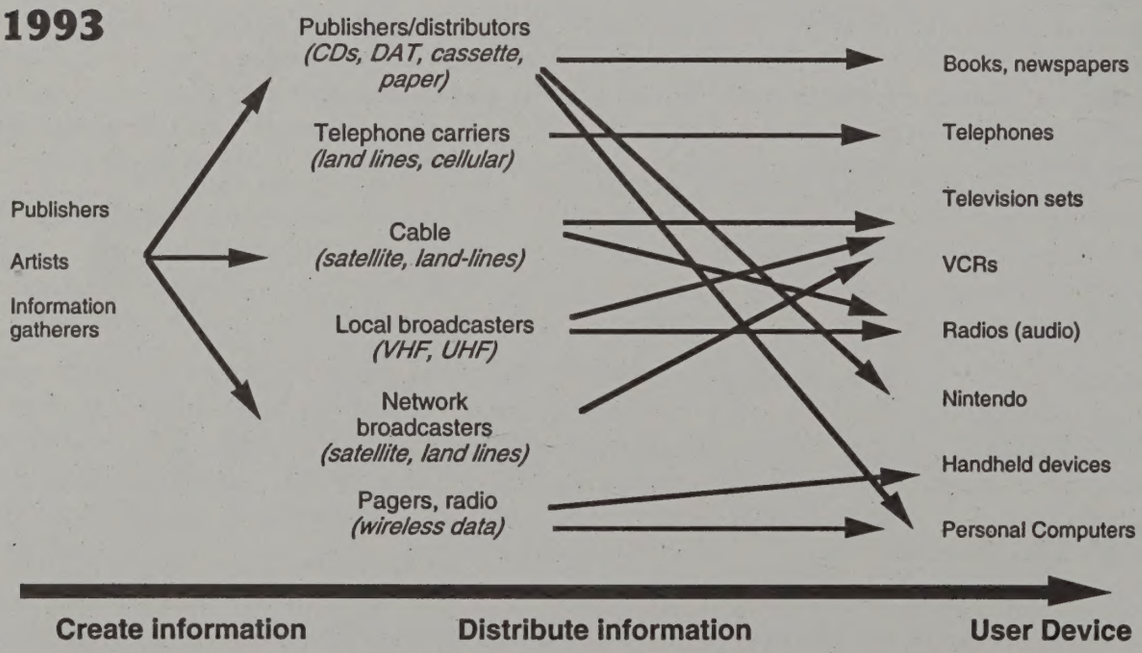
c. 1975



Before the divestiture of AT&T, the U.S. wide-area information communication system was relatively stable. Distinct technologies were developed by companies/institutions that were aligned with distinct or closely-related market opportunities. Carriers and distributors focused on one or two technologies almost exclusively and were single-handedly responsible for making them work by setting and adhering to standards.

Source: IDC, 1993

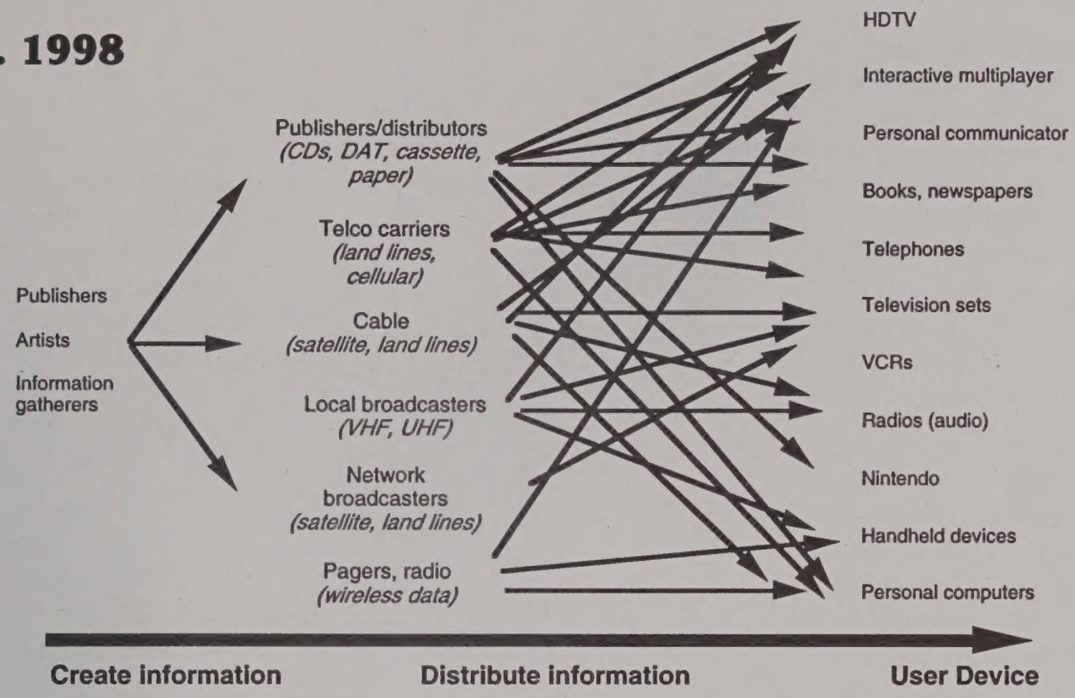
c. 1993



Twenty years later, telecommunication carriers, as well as broadcasters and other carriers (cellular and cable, most notably) have made significant inroads into a broad range of markets, often taking advantage of alternate technologies. Two of the most significant results: intense sparring is taking place between carriers seeking the upper hand for new services, and publishers are finding new delivery schemes for their content.

Source: IDC, 1993

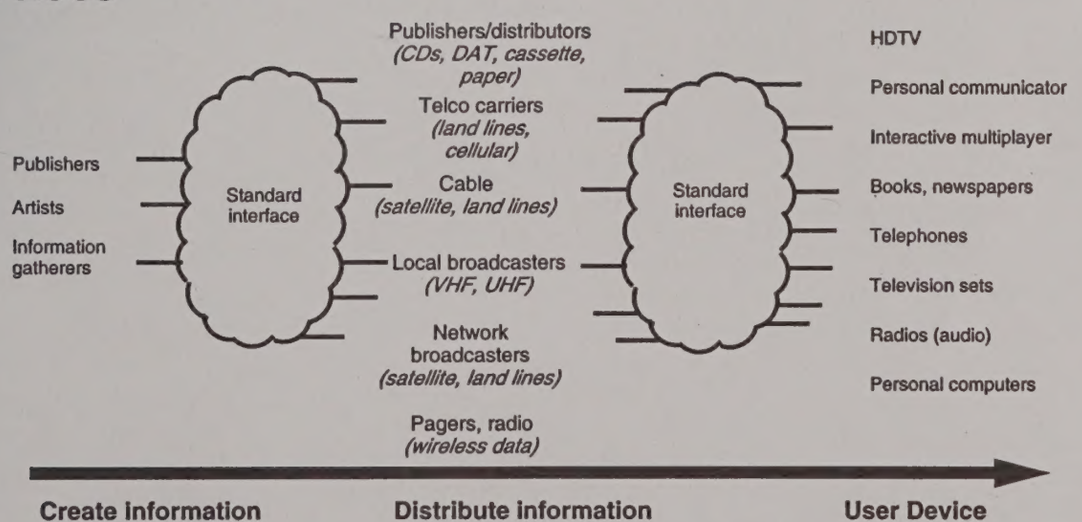
c. 1998



Over the next three to five years competition between all different kinds of carriers will reach a peak. Their primary motive: to position themselves as major infrastructure providers for new high-volume (high-margin?) products: information services, wireless personal networks, broadband individual messaging. To reach the broadest market, publishers will distribute over any technology present.

Source: IDC, 1993

c. 2005



Eventually carriage will become almost entirely technology neutral. Standards between hardware, software, transport and services will mean that neither artists nor end users will know, nor will they care, which medium is transporting their services and information.

Source: IDC, 1993

Outlook for the New Platforms: Life Cycles and Disintegration

Much of the growth in the computer industry has been a direct function of two occurences: the introduction of new architectures which delivered improvements (measured, as the industry matured, along a variety of scales) in performance and price, and the automation of new groups of tasks and processes. Often the two have gone hand in hand.

The S/370, for example, was the first platform to provide large organizations with a simple and manageable programming environment. The VAX provided interactivity, connectivity and scalability. Both ushered in new periods of industry expansion.

In both examples growth occurred when a new architecture was used to automate new tasks and processes (mainframe/backoffice, minicomputer/department). The combination of hardware, software and services was integrated into a single package capable of performing new functions, or which reached new levels of price performance.

More recently, the PC business took off when IBM, Intel and Microsoft built the IBM PC standard. It was a tightly integrated package that produced a quantum leap in new function and price performance.

Novell's recent ascension is in part due to a similar phenomenon. NetWare's relative ease of use and its emergence as a de facto standard attracted broad support from the industry. The result: today's boom in network computing.

Will new technology yield similar results in tomorrow's new markets? It may, if two conditions are met. Discrete technologies need to be integrated into faster, more functional products. And, those products need to be targeted at customers' specific needs.

Meanwhile, the nature of coalition building and introducing new architectures is becoming more complex in terms of number of collaborators, potential conflicts, and speed to dis-integration.

- **More collaborators.** The packaging/integration of components to deliver new function has recently involved more and more suppliers of hardware and software. Initially, single vendors (IBM and DEC, for example) supplied integrated packages to end users. Three major players (and hundreds of ISVs) made the IBM PC formula a success. Most recently Novell partners with dozens of companies and thousands of ISVs.

It follows that as the value chain extends upstream into information content, the number of partners increases. Alliances are becoming larger and larger coalitions with a more and more diffuse message.

As IBM's travails have shown, mobilizing a large organization can be very difficult. The sheer number of participants can have an inverse relationship to the success of the organization.

As a result, getting a critical mass of industry attention is harder. Despite the initial visibility of great numbers of participants, products are what makes or breaks the alliance. After a few months, when it's time for products to gain attention, not names of backers, the alliance's size may prove too unwieldy.

- **More conflicts.** Not only are alliances larger, but they bring more and more diverse companies together. Intel, Microsoft and IBM all had (emphasis on "had") similar goals for the IBM PC. Regulated carriers, unregulated carriers, advertising agencies and content providers bring entirely different goals into the new alliances. Conflict will center around copyright protection and transaction security.

Any new alliance faces a fundamental question: can it succeed if two or more "partners" bring diametrically opposite philisophies?

For example, look at the implications of interactive transaction processing services. Interactive shopping and custom merchandising promise to play a huge part in defining the kinds of services available on the network. It follows that Home Shopping Network-like companies will make important contributions to the design of some part of the new standards — probably software.

HSN might stress the importance of easy-to-access credit information. Since such ability carries some performance overhead, the performance of entertainment products may suffer. Entertainment software suppliers, too.

Or, to look at another example, how can any single alliance address the highly senstitive copyright question? The electronic information services industry is built on huge user fees for centralized databases of historical information. Their rationale for the high fees: protecting information assets.

At the other end of the spectrum, the computer community

places surprisingly little value on raw information. Practically none, in fact. Almost any kind of information is available somewhere on the Internet. The only problem is finding it.

Arguably two such divergent views of where to add value (and generate margin) will remain at odds forever. If representatives of the two different views attempt to agree on a single new business model mayhem will likely result.

- **More quickly.** Dis-integration is happening more quickly in newer markets because technologies driving them are turning over more rapidly. For example, four years separated the releases of the original DOS on the IBM PC, and its first major enhancement, DOS 3.1 in 1984. Barely two will separate the release of Windows 3.1 and Windows NT. The 80286 was released three years after the 8088. Only 18 months separated the releases of the 486 and of Pentium.

Just because technology is moving faster doesn't mean standards will disintegrate more quickly. On the other hand, almost every company that has remained attached to an old platform in the face of new standards (Apollo, Digital, Wang, Victor, e.g.) has missed a significant opportunity.

The confusion comes in differentiating between technical features and function. When features enable new function old standards are in trouble and integrated standards will begin the disintegration process.

As long as technological features keep translating to useable function, the time-to-disintegration will continue to decrease. Shelter from competitive pressures in component markets will not last long. Given the kinds of functional leaps that the proposed new standards seemingly offer, alliance partners should likely gear for rapid ramping up and down.

Baseline Standards for the New Standard

What does all this portend for future platforms, and for suppliers of today's hardware and software? Several broad themes emerge:

- **Performance, performance, performance.** New platforms need hot technology and performance more than anything. Even very aggressive upgrades and modernization will not keep up with the revolutionary increases in function offered by new platforms.

Several "new platforms" have died aborning for lack of sufficient functional improvement over existing systems: Philips' CDI is interesting technology. But it is impaired by a lack of full motion video. 16-bit video games haven't offered sufficient functional improvements to warrant widespread purchase.

In digital media, new performance and function means either new information, new ways of slicing and dicing information, new ways of displaying information, or new ways of transporting and personalizing it, in some combination.

- **Price point.** Of course, most consumers need more than just performance. The primary reason for buying any new device is the coupling of enhanced performance and function at attractive price points.

Only a very small proportion of consumers will buy the latest and greatest technology, just for technology's sake. Even with amazing new performance, most consumers won't pay much more than $200-300 for a new hardware/software multimedia system.

- **Broad interoperability.** Coalitions that seek to define the shape of next-generation communicators/computers will need to engender support from far reaches of the industry. Their software needs to run on every manufacturer's device (like the cassette tape, not the CD), across the spectrum of the industry.

The current market for multimedia-equipped PCs, for example, is woefully segmented. Several potential multimedia platforms—Microsoft's MPC and the Mac, most notably—lack the most basic software interoperability. In fact, some of the MPC-certified CDs didn't even run on all MPC systems.

In this respect, perhaps the most significant of 3DO's partners are Time/Warner and MCA. If anyone understands the importance of interoperability it is consumer electronics and entertainment companies.

Two unlikely partners may have one answer. Kaleida, the joint venture between Apple and IBM, is developing a language called ScriptX that promises some level of interoperability across hardware platforms. Several questions about ScriptX's long-term staying power remain, primarily its focus on local, as opposed to distributed, applications.

- **Multiple concurrent, flexible partnerships.** Companies will need the ability to jump on and off bandwagons quickly.

AT&T is the best example of a company that is playing multiple partnerships. It is hedging its bets with equity stakes in three major new platforms (3DO, EO, and General Magic).

Can the Computer Industry Compete and Collaborate with Publishers and Carriers?

A significant proportion of the computer industry's attention is focused on the future of information communication. In the past few weeks IBM has invested in a movie studio and established a multimedia venture capital group. General Magic has outlined plans for a new comm-centric application development language, and the founder of Electronic Arts has unveiled a new home computing device—in conjunction with AT&T and Time/Warner.

The attention is well deserved. Digital media portend great opportunity to the computer industry and for individual companies to expand influence and earnings. Companies that make the wrong decisions may see a long-term decline of their overall industry market share.

How will the new products and markets take shape? Opportunity in the computer industry has almost always been created and exploited by tightly integrated products and services — the S/370, the VAX, Visicalc on the Apple II, and Lotus 1-2-3 on the IBM PC, for example. In each case, end-user functionality was increased by the ease of use of a new hardware/software (sometimes services) package. The additional functions jump-started a new growth phase for the industry. After a period of customer acceptance, the integrated structure inevitably gives way to compartmentalized competition within distinct segments.

Digital media will be no different. Tight integration between hardware and software will be needed to build products and services that people and organizations want. Three new platforms are most visible - Apple's Newton, the 3DO interactive multiplayer and EO's personal communicator. Notable in their absence from any of the three groups are Intel and Microsoft. For good reason: their competitors seek to prevent them from using current market share to dominate the next growth phase. (As we go to press General Intrument, Microsoft and Intel have announced an effort to jointly develop next-generation hardware.)

The question of alliance and coalition building to deliver new functions is essential to the computer industry's participation in digital media markets of the future. It leaves computer companies with at least two very basic questions: With whom should companies partner? And, how rapidly will the new business then disintegrate?

If history is any judge, this integration will coordinate more and larger organizations, more applications, and it will integrate and disintegrate more quickly than past (and present) cycles. These changes are due, at least in part, to the following:

- **Diverse needs and uses.** Different users of communication services demand different functions. For example, consumer electronics communication provides entertainment to the home; data networks and fax communication provides information and data to coordinate action in organizations; traditional telephony provides personal contact to individuals and organizations. These wild differences mean companies may find new markets — and new competitors attacking them — overnight.
- **Substitution, leapfrogging and synergy.** Wide-area, broadband, wired and wireless digital communication technologies will expand the bandwidth and throughput of our current communication infrastructure. Highly diverse services will be delivered from the common infrastructure. Market dynamics (channels and advertising, e.g.) from the different industries will be rearranged in the new scenario. The convergence (or, mutual leapfrog) of the computer and communication industries will create a business with a new dynamic that contains some characteristics inherited from each of its predecessors.
- **Shifting integration.** In the traditional information model (such as a magazine or television), end users receive a finished product that has been completely integrated and packaged for them. New content-based applications are structured on seeking, selecting, mas-

saging, and handling information. The new model supposes that users assume a greater responsiblity for packaging and integrating information, software, and hardware. Information providers (many from outside the traditional computer industry) and IT companies are drawn inexorably into a new industry model.

- **Clash of cost-structure and agendas.** Never before in computer-industry coalition building have potential partners been so different. The diversity of business models and agendas across the four major converging industries — computer, consumer electronics, information services and publishing — is dizzying. Alliances will, by necessity, be less formal and more transitory.

Looking back (the Carterfone decision, the introductions of color television, personal computers, and MCI long distance, to name just a few) shows that a similar level of confusion and frustration seems common during such historic phase changes.

Yes, opportunities are spread along the entire spectrum of the new industry's value chain. The challenge for computer hardware, software, and services companies is to address development efforts at specific segments of the new industry's value chain by leveraging existing capabilities or developing new ones.

No single company can afford, financially or technologically, to develop anywhere near the entire range of products. As a result, getting discrete products to market necessarily involves alliances and partnerships.

New Platforms and Services: Notable Players and Their Collaborations

Listed below, by industry and company, are examples of some highly visible digital media programs and research underway at leading companies.

Computer Companies

Apple

Investment in General Magic; investment in America Online; Newton licensees and partners; Kaleida (with IBM) ScriptX: a cross-platform multimedia-enabling operating system extension that is aimed at broadening multimedia application market.

HP

Manufactures cable converter box for TV Answer.

IBM

Fireworks Partners (multimedia venture capital, including investments in movie studio — Digital Domain, Audio Visual Connection multimedia software); multimedia applications trials with Ameritech in early 93; ownership with Sears of Prodigy network.

Microsoft

"Cable TV converter box development efforts with Intel and General Instruments; next-generation cable programming discussions with Time/Warner; successful CD title publishing operation, including "Encarta" encyclopedia.

Communication Companies

AT&T

Investment in EO, General Magic; cable delivery testing with Comstream, Scientific Atlanta; video on demand trial with US West and TCI; video compression based on AT&T/Zenith HDTV proposal.

RBOCs

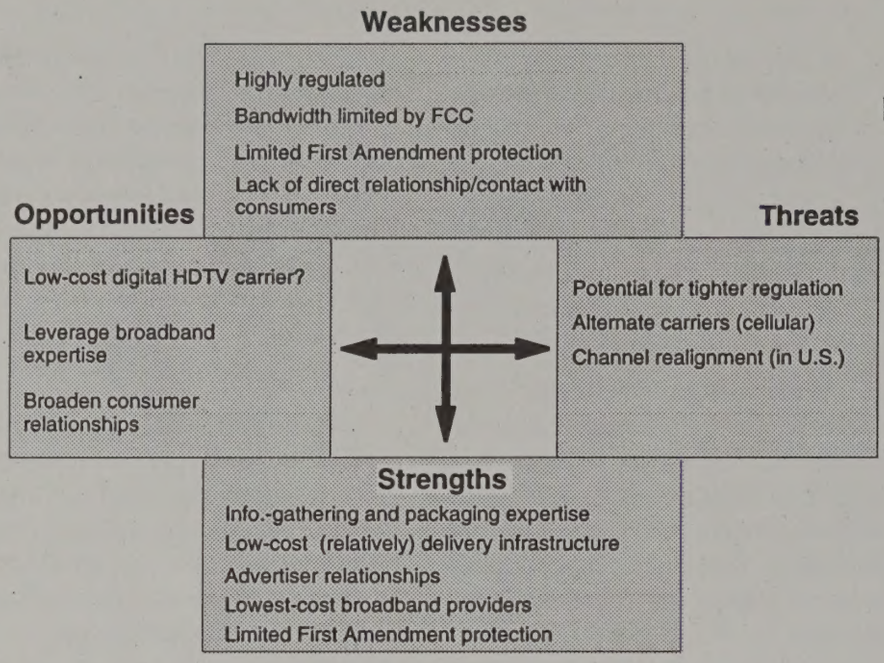
Every local exchange carrier has major fiber-to-the-home tests underway. In addition, Southwestern Bell owns Montgomery County (MD) and Arlington (VA) cable systems; Ameritech and Cardinal Communication are collaborating on fiber distribution; Pacific Bell is inaugurating CalREN broadband research network.

TCI

$2 billion fiber upgrade underway; partner with Sega and Time/Warner for online cable game channel; owns 49.9% of Teleport (alternative access provider); video on demand trial with AT&T and US West.

Time/Warner

Investor in 3DO; building ATM-based digital cable system in Orlando (FL); partner with Sega and TCI for online cable game channel; successful publisher of CD titles; in discussions with Silicon Graphics for interactive graphics cable converters.

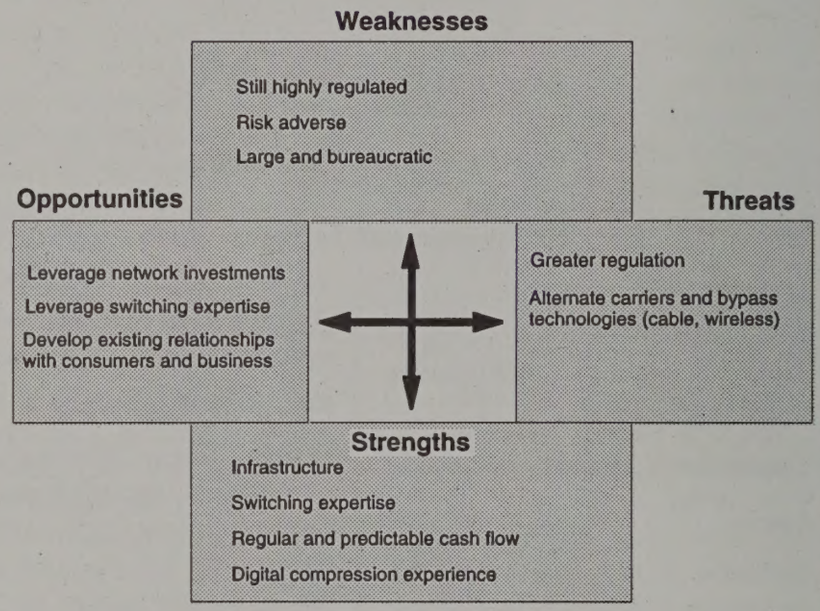


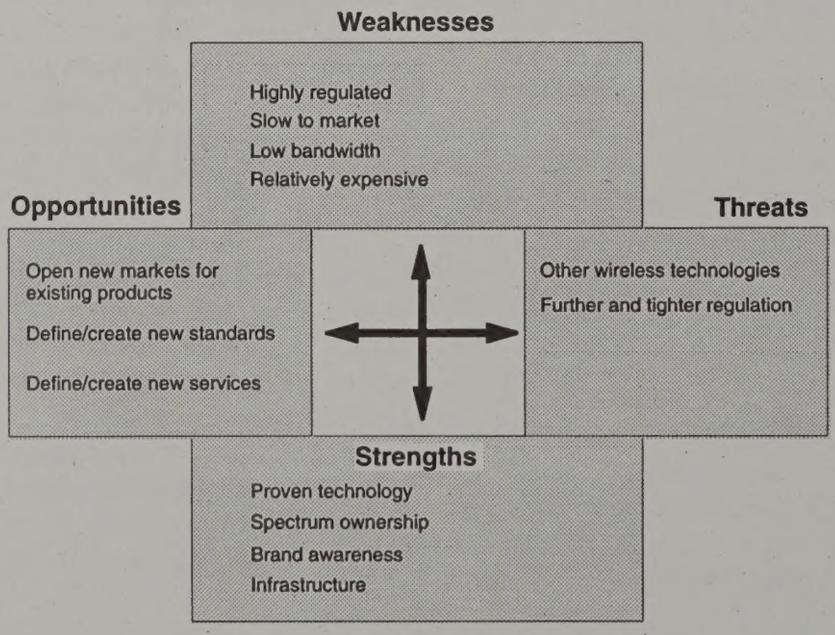
Local and Network Broadcasters — Competitive Outlook

With cable penetration over 60% and network share at an all-time low, no single industry in the convergence is as beleagured as broadcasters. It won't get any easier. A 6MHz digital HDTV standard may not require channel realignment, but may be carried by competitive wireless carriers like cellular or satellite. The National Association of Broadcasters is lobbying hard to protect station-owners rights to renew broadcast licenses (what used to be called a license to print money), but even that won't guarantee a return to past levels of profitability.

Telcos — Competitive Outlook

Telco network owners and operators are well positioned to benefit from a higher volume of digital services. Their chief competition, cable, is limited and may not be able to finance the huge cost of upgrading. The telcos are assured of a major role in the transmission of some portion of new information services. One key question: how will telcos collaborate and compete with broadband wireless carriers to expand the functionality of the new products?





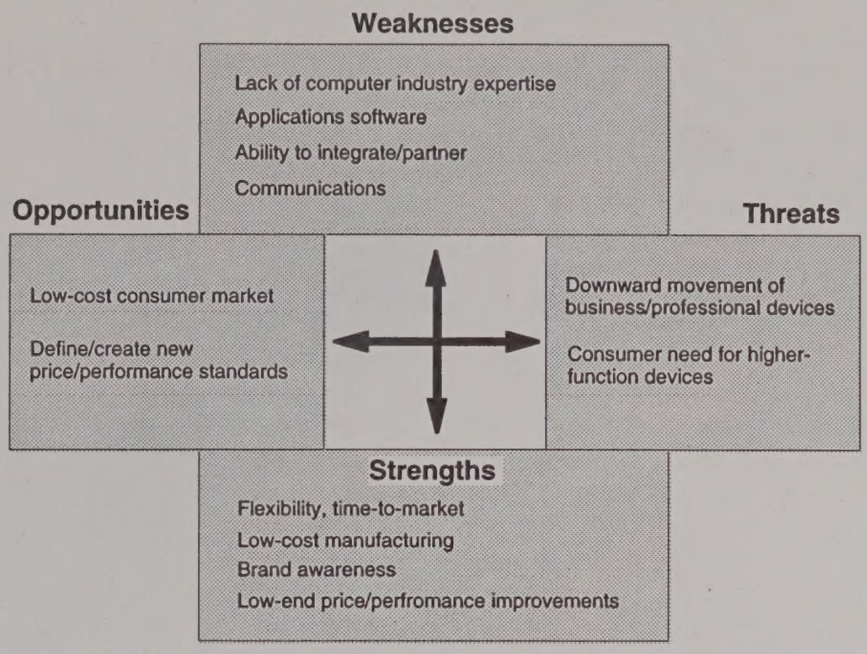
Cellular Carriers— Competitive Outlook

Great momentum, lean organizations, profitable — everything seems to be going well for cellular telephone carriers. Don't be surprised, though, when they face increased competition from new two-way wireless technologies. Their key challenges are to integrate digital technology into their networks, and to define and provide useful services to personal communicators.

Source: IDC, 1993

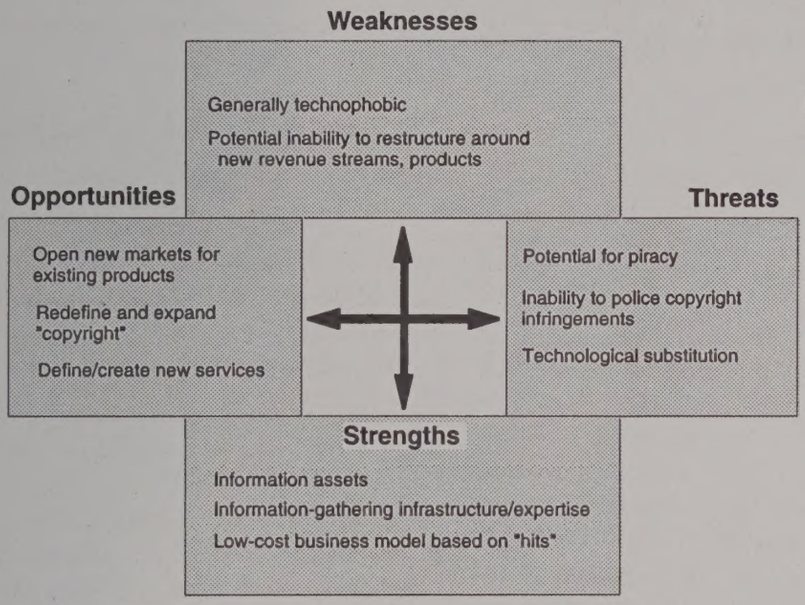
Consumer Electronics Suppliers — Competitive Outlook

The lines between pocket organizers (from Sharp and Casio), portable multimedia players (MMCD from Sony) and PCs are blurring. Consumer electronics companies are preparing to address a broader market: integrated home/office information. No one doubts their ability to design cool hardware. Their fortunes in the new market depend upon software and function: can they build fast-enough and standard-enough devices to attract major-league software developers?



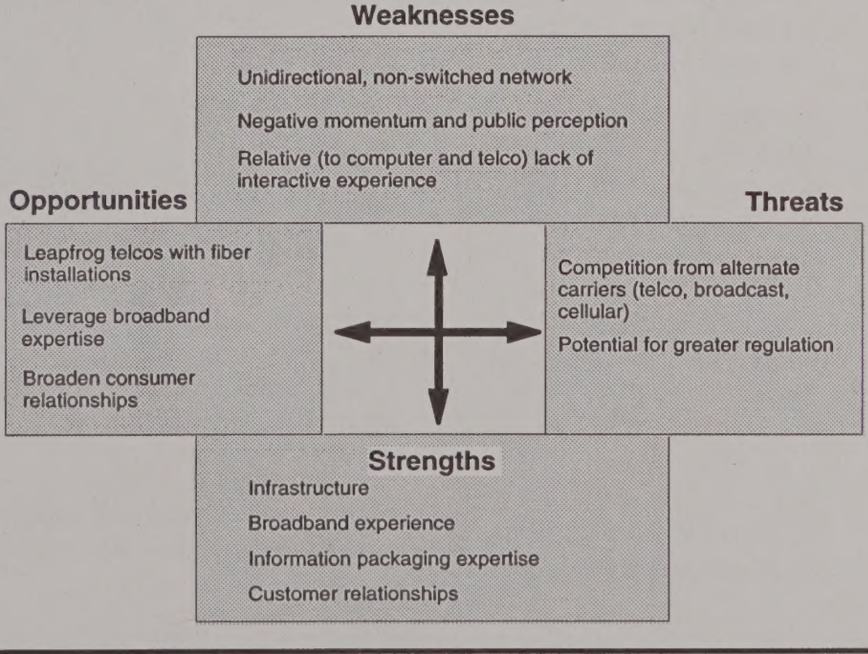
Information Publishers and Providers — Competitive Outlook

No industry group feels more threatened by the information revolution than those companies that own information assets, or whose business depends on continually creating them. It is the rare publisher indeed that looks upon the new era with excitement. The problem is piracy. Figures from the Software Publishing Association show that almost as many people steal software as buy it. This strikes fear into the hearts of publishers. Digital media represents the single greatest leap for information creators since the printing press. Taking advantage of it will require a whole new philosophy.



Cable TV Carriers — Competitive Outlook

Cable carriers are scrambling, knowing well the implications of telco entry into broadband, digital, consumer markets. If further competition (beyond VCRs and satellite) is introduced in cable's core markets, customer loyalty becomes paramount. Cable will no longer be able to thrive exclusively by distributing programs; packaging, billing, and customer service will become more important. Cable will need to better leverage relations with, and understanding of, customers to continue to grow.



Source: IDC, 1993

New Silicon: AT&T's Hobbit and ARM's 6 Family

The three new hardware platforms examined in the chart on page 9 are based upon two low-end RISC microprocessors from Advanced Risc Machines and AT&T. In many ways ARM's 6-based family and AT&T's Hobbit are more alike than different.

ARM was formed in 1990 by Apple, Acorn Computer, and VLSI to build a low-cost, low-power microprocessor. Much of the core 6-family development was completed at AT&T under contract to Apple, and to Apple's specifications.

AT&T's Microelectronics has been the driving force bringing Hobbit to market, although AT&T's computer systems group was responsible for the initial development. The two new microprocessors have several advantages over existing architectures and competitors:

- **Small/inexpensive.** ARM's lack of integration, its small number of registers and low pin count have resulted in very low cost — about $60 in quantity. The Hobbit CPU costs $35 in quantity; in a typical design the microprocessor and chipset will total approximately $100.
- **Performance.** Both architectures further blur the differentiation between CISC and RISC and deliver surprisingly strong performance for small, inexpensive microprocessors. The high-end Hobbit implementation carries performance roughly equivalent to a 33MHz 486SX. The ARM chip was chosen by 3DO for its performance and not just its low cost. 3DO's emphasis on leapfrog graphics performance makes that quite an endorsement.
- **Power consumption.** Hobbit packs approximately 37 VAX MIPS per watt, almost five times that of the Intel 486DX. ARM's 600 family employs mostly static circuits that can be managed by controlling the chip's clock rate, which varies from between 20MHz when active to only 1MHz in a standby state.

Are the new-platform markets big enough for both products?

Volume questions cannot be completely addressed until functioning units are available and their appeal to consumers can be tested. Few thought the 8088 would enjoy such a long run.

However, both sets of chips are inexpensive and functional enough to have broad uses beyond the three platforms here. That might be enough to drive costs down and push R&D far enough to build a next generation of products that can address the opportunities outlined by these initial platform implementations.

Can the two microprocessors coexist?

The biggest threat to ARM and AT&T Microelectronics comes not from each other but from Intel. Next-generation futuristic vision notwithstanding, Intel owns the portable computer market.

And yet both ARM and Hobbit appear to have plenty of headroom. ARM's low cost and power orientation make it perfect for a wider variety of handheld products. Hobbit's comm-centricity may lead it down a higher-end evolutionary path. It may be a platform that focus on higher-cost communications services for professionals and not necessarily consumers.

The more important question concerns Intel. How long can the upstarts perpetuate their two big advantages (low power and low cost) over Intel? And, will product-direction announcements from Intel stall the development of software for the new platforms?

What are the gating factors for each chip?

Partners and product implementations make or break a new chip design. Raw performance is important, but not as important as broad industry support.

ARM appears to have an early lead. With Apple and 3DO leading a very diverse bunch of hardware, software, and services partners, ARM is extending its reach far beyond its own modest marketing budget. Among the companies building some kind of ARM-based hardware are AT&T, (THAT must have been an interesting meeting!), Cirrus Logic, GEC Plessey, LSI Logic, Matsushita, Motorola, and VLSI.

But Hobbit is no slouch. At its rollout last fall, EO announced major support from Marubeni and Matsushita. Since then NEC has announced intention to begin production of Hobbit (scheduled for 1994).

Computer Companies in the Information-Age: Six Big Opportunities

Following is a discussion of six areas where the IT industry has a significant opportunity to influence the development of new information services, products, and revenue.

Revenue shift: hardware to services. Can you remember how much you paid for the converter box on top of your TV set? If you're like most cable TV subscribers, you only rent it. How much do you think it cost to make the box? Unlike most consumer electronics businesses, cable companies make their money on software, not on the box itself.

Prices for home computing equipment may soon resemble pricing for cable converters. Manufacturers may give away PCs just for the right to sell their owners software. It's worth it to lock in customers and build long-term relationships.

Manufacturers can still make money selling hardware, but the competition will be fierce. Lower-profile manufacturing organizations may have the upper hand. Unless ymanufacturers want to play on their terms, with their margins and lead times, they will be tempted think about a whole new business model.

Revenue shift: advertising to direct. Initially the advertiser-supported revenue model of today's media businesses will carry into the new industry. The cost of programming will be heavily subsidized by advertisers vying for consumers' attention.

Sometime in about five years, however, revenue derived from subscription fees and what used to be called pay-per-view will surpass advertising revenue. The price we pay for information bears little relation to the cost of assembling it. In the future, the price will more accurately reflect the sum of its costs.

In the new industry, consumers will need better means of tracking information expenses in real time. Programmers will need digital-media analogs to Nielsen ratings and people meters.

Data brokers. A large industry will develop around the management and administration of private information about individuals. As individuals increasingly pay for information and pick and choose between advertiser-supported information services, it will help mediate between suppliers and consumers.

Computer services businesses will negotiate with individuals, information providers, advertisers, and carriers to effectively manage individuals' information budgets ("I can't quite afford the advertisement-free version of 'Casablanca' — give it to me with one big interactive infomercial."). Suppliers will need to build privacy safeguards.

Automated transactions and billing. The current online and automatic transaction processing infrastructure will be unable to support the volume of electronic business. It is unlikely that live operators will be "standing by" ready to talk to consumers watching Barry Diller's 500 home shopping channels. Interactive, automatic client/server transaction processors will mediate the new panoply of electronic commerce.

Today's back-office transaction systems and monitors may be neither robust nor fast enough to handle online, on-demand transaction processing.

Storage explosion. The storage needs of online news, information, and entertainment distributors dwarf those of traditional IT users. Their scale economies are huge. Storage farms will become the computer industry's agribusiness of the next decade.

Storage suppliers will need to expand their management capabilites and response times by exponential factors. They'll need to develop flexible and fast products that are highly customizable, and absolutely transparent to end users.

Copyrights and hackers. Computer hacker and information provider views of the digital media could not be more different. Hackers believe information should be free and almost limitlessly copyable. Information providers believe just the opposite. Opportunity lies somewhere in the middle: in defining and creating rules and guidelines for information copying, tracking and billing.

Digital Media: the IT Industry's Opportunity Is Limited by New Partners' Ability to Change

Where and how will computer companies thrive in the world of multimedia highways and infotainment interstates? The answer lies in how well the computer industry can work with and guide much of the broader information industry.

Computers will of course be everywhere. Microelectronics and software lie at the heart of the transformations under way. Computer companies will dominate the new industry by knowing more about the core of the digital revolution than any potential competitors.

On the other hand, the industry is running with some fast dogs. Companies are allying themselves with big partners, including telecommunication carriers, cable carriers, video programmers, broadcasters, consumer electronics companies and publishers. In terms of revenue and capitalization, they dwarf the computer industry when combined.

As we stand at the edge of major new expansion and opportunity, it is wise to remember that if the computer industry knows anything, it knows how to take advantage of technological change. Certain companies and people in the industry understand short product cycles, fast ramps, flexible organizations better than almost any other industry. In the computer industry it is easy to underestimate how rapidly our cost structures, revenue models and profitability have been changed as a result of technological change.

However, our customers and other constituents may not embrace IT-propelled change. Many other industries feel almost exclusively threatened by how IT products may change their businesses.

Consider the publishing industry. Newspapers are dying a slow death. Readership is off. Advertising lineage is down. Newspapers need to develop better means of communicating. They need to recognize that jungles of highly individualized information networks (like the Internet) mean a more robust and a more functional First Amendment, and not just a threat. They need migration strategies to bring their entire organizations into the information age.

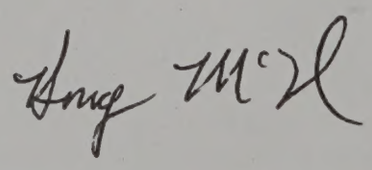
Some news organizations think such change is terrible. Others think it inevitable, and maybe not so bad. Chilton R. Bush, who chaired the journalism department at Stanford University during the 1930s, '40s, and '50s, jokingly suggested that if society really wanted to save newspapers, then newspapers should be granted the exclusive Coca-Cola franchise in their service areas. His reasoning: sugar-water profits could subsidize money-losing newspaper operations!

Much of today's discourse is equally comic. Should we grant our new partners a cola franchise? Or, should they be expected to change as society changes?

When it comes to communication, companies and institutions are less important than the information they deliver. Newspapers themselves aren't very useful — *knowing* what is happening in the world, where, and why is very useful, however. Video stores aren't important — *laughing or crying* while watching a good movie is. Telephones and telephone companies aren't useful — *staying in touch* with business partners and family members is very useful.

Technology is creating better ways of spreading information. Some cherished traditions will necessarily pass into obscurity while new standards rise to power. Companies clinging to a single business or business model are unlikely to survive.

As the new industry and new relationships develop, it will be more than just interesting to see how well other industries adapt. The most prescient of them will worry less about preserving the past than molding traditions and values into a new form in the future. Much of the IT industry's success will be measured by their ability to change. Let's get to work!



THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | MAY 7, 1993 | VOL. 28, NO. 13 | Published continuously since 1964.

How Do Economic Outlook, Cultural Idiosyncrasies, and International Standards Affect IT Budgets?

The factors affecting an organization's IT spending include, at least, these: overall economic conditions, national culture, business environment, corporate culture, senior system installed, vertical market, and others. Together they constitute a shifting mosaic of influence over IT budgets around the world. Interesting information for IT suppliers and marketers — but exactly how do they interrelate?

Quantifying each factor's influence is the ultimate goal of much of IDC's demand-side research. For example, how direct is the relationship between a country's economic performance and its overall IT enthusiasm? Do internationally recognized standards and technologies play a more important role in shaping IT budget planning than individual culture? Are individual country markets becoming more similar? The answers provide a foundation for many basic marketing activities: product development, staffing, and investment strategies, to name a few.

International Data Corporation's annual Global IT Survey (this year with over 5,000 surveys in the six largest Western economies) provides detailed information where different economic conditions, national culture, and business-specific factors intersect. It is IDC's broadest and most detailed demand research.

Results from the 1993 Global IT Survey are in. United States IT buyers continue to lead other countries with guarded (and rather unexceptional) optimism. Germany and Japan have come back to earth, with more conservative IT budgets and plans. Japanese users' intolerance of proprietary systems (specifically, of the premium prices associated with proprietary systems) is accelerating. Of perhaps greatest surprise, U.K. sites are far more positive and optimistic than just a year ago. Some of our specific findings:

- IT spending growth. Respondents in the United Kingdom are very optimistic about IT spending in 1993 — 54.1% expect an increase in IT spending followed by Germany (where 44.0% expect an increase), and to a lesser degree the United States (38.5%). Overall, 36.8% of respondents expect an increase in 1993.
- And declines. Many of the French respondents are expecting decreases in 1992 IT budgets — 27.7% of them as opposed to the 15.9% of worldwide

IN THIS ISSUE:

How Do Economic Outlook, Cultural Idiosyncrasies, and Technology Standards Affect IT Budgets? 1
Economic Factors 2
Key Information Systems Challenges 3
Adoption of New Technology 3
Technology Directions and Individual Countries 5
Multiuser System Capacity 6
Satisfaction with Primary Vendor 6
CEOs Around the World Still Expect More from Information Technology 8
Centralized IS 8
Vendor Relationships 8
Computer Industry Terminology 8
IT Payback 8

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respondents that expect 1993 IT budget decreases.

- Hardware capacity. Approximately one-quarter of respondents in each country indicate that they have enough hardware capacity, and that they are now investing mostly in software and services.
- Key challenges. Almost without exception, improving organizational competitiveness is identified as the single most important goal of IT groups worldwide, followed by migrating to newer platforms. In Germany, integrating central and end-user resources was viewed as the most important challenge, ahead of increasing competitiveness.
- Cost control. IT organizations feel that controlling costs is not their primary worry. It was ranked a distant fourth behind improving competitiveness, migrating to newer platforms, and integrating centralized and end-user resources in terms of overall importance. Controlling costs was most important in the U.K. (where, still, only one-fifth of respondents felt it was the most pressing IT concern).
- New technologies. The United States remains more committed than other countries to testing and adopting new technologies, followed closely by the United Kingdom. Germany is far less interested than last year. Japan remains behind other major countries in terms of new technology adoption. In general, France and Italy are the least aggressive adopters of new technologies.
- IT satisfaction. Japan may no longer be able to afford the highly proprietary systems upon which much of its IT structure is based. Japanese IT managers are far less satisfied with their primary IT vendor than any other country.

IDC's Global IT Survey pinpoints how two factors—economic outlook, and national culture—combine to affect users' spending habits. It provides great insight into how general user strategies and opinions affect spending. (For a full discussion of the components and dynamics that shape demand for information technology, see the *Gray Sheet* 27:20, August 14, 1992.)

In this issue of the *Gray Sheet* we present some of the highlights of the research: the influence of economic factors, major IT challenges, new technology adoption, and technology strategy.

In addition to these areas, the survey also examined customer attitudes in a host of areas. These include adoption of new technology (CASE, CD/ROM, color printers, EDI, fax boards, multimedia applications, multiprotocol routers, object-oriented programming, and others), similarities and differences between responses at different levels of organizations, and the important influence of vertical markets and host environments. This information will be available in forthcoming research; please contact IDC for details.

Economic Factors

The importance of national economic performance on IT budgets cannot be taken lightly. But that relationship is neither clear nor direct, and can be somewhat overshadowed by other factors, such as vertical markets, host environments and business strategies.

In general, where IT budget expectations are down, national economies are likely to be down as well. For example, in Japan IT expectations for 1993 are less likely to increase over 1992 levels than in other countries, a result that coincides with worsened (since last year) economic outlook in Japan. The lingering French recession is at least partially to blame for the large number of sites that expect 1993 IT budgets to decrease.

And in at least one case, good economic news was accompanied by a stronger IT budget. Slight improvements in the U.K. economy are accompanied by a much rosier IT outlook. Approximately 54.1% of U.K. respondents indicate that IT budgets will increase from 1992 levels. For comparison, only 36.8% of worldwide respondents indicate that 1993 IT budgets will increase from 1992 levels.

However, Germany's disappointing economic performance has had a different effect on IT

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outlook. Germany is very optimistic — 41.6% of respondents expect to continue investing in hardware, software, and services in 1993.

A growing economy does not mean a more positive IT outlook. And, although the U.S. has slightly more optimism for IT budgets than average, not by much. The United States has been pulling out of recession (albeit very slowly) a step ahead of the rest of the world.

Key Information Systems Challenges

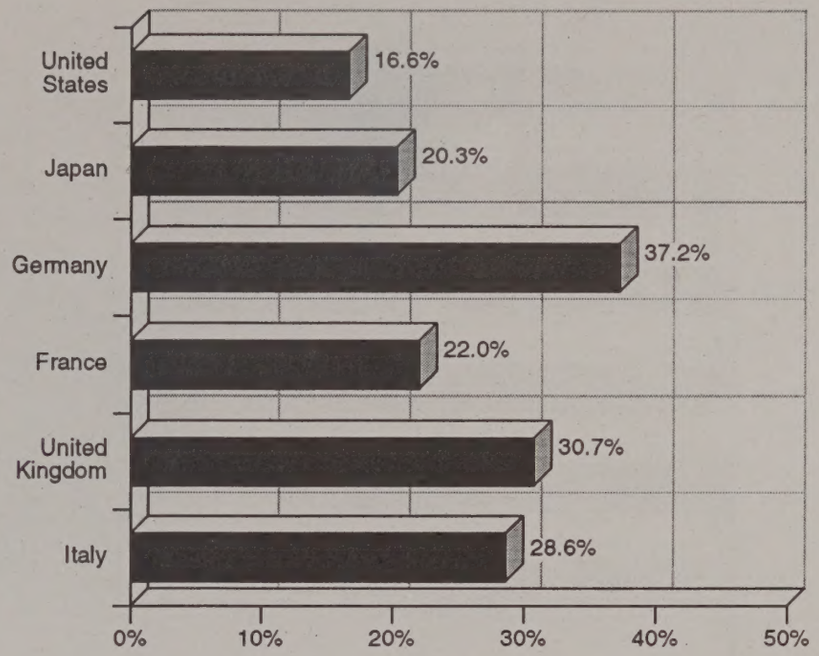
Where do countries agree? France, Italy, Japan, and the U.K. all identify very similar IT goals and challenges. Indeed, every major country except Germany agrees that improving organizational competitiveness is the single most important goal of IT groups worldwide. Outside of Germany, approximately one-third of all respondents cited it as their chief concern.

German respondents instead feel that integrating central and end-user resources was most important. Perhaps a reflection of social and cultural pressures for visible and definable structure and communication, the German desire for an ordered IT organization is unmistakable.

The United States breaks from the pack when it comes to committing to new systems and integrating older ones. The U.S. is more concerned about migrating to more modern platforms than any other country and is least concerned about integrating central and end-user resources. Respondents here seem to be saying that they think having the latest and the greatest is very important, and that they'll just figure out how to integrate it all over time if they have to.

Finally, Japan and the U.K. are both slightly more concerned with controlling costs than other countries. Only Japan identified recruiting and retaining staff as of major importance.

Key IT Focus: Integrating Central and End-User Resources



Share of country market that considers integrating central and end-user resources into a single enterprise information system to be the most important area of IT focus over the next 12 months

Source: IDC, 1993

Adoption of New Technology

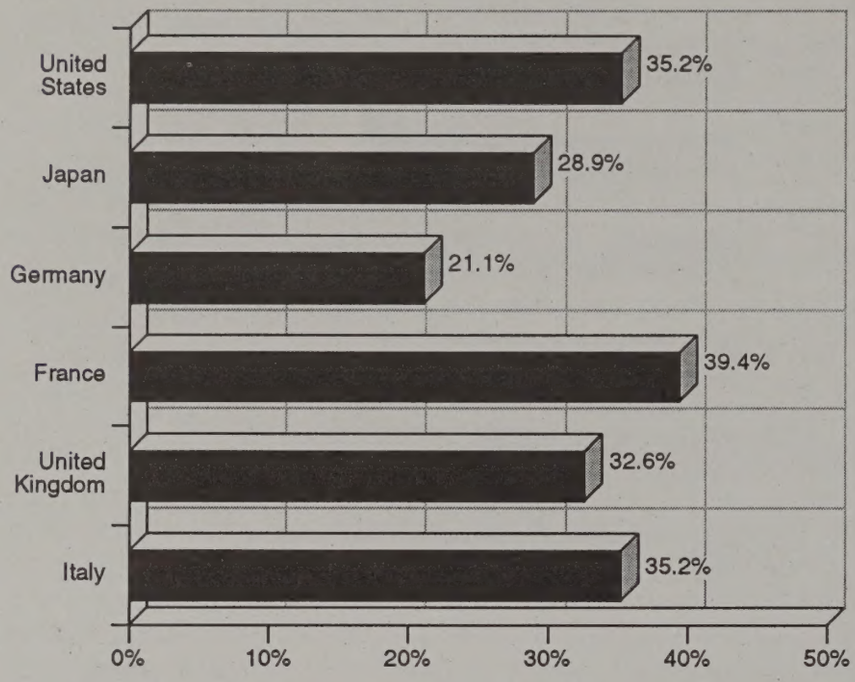
Attitudes toward the use of new technology are also affected by overall economic conditions and outlooks in different countries. Last year, for example, Germany and Japan were much more enthusiastic about new technology than they were this year. Respondents in the United Kingdom were downright pessimistic about almost all new technologies.

This year the roles are reversed. Neither France nor Germany, where the recession has lingered longer and deeper than in the U.S., are not as hopeful in their use of new technology as they were last year, when they were slightly more enthusiastic about new technology than the U.S.

Perhaps the biggest story is in the U.K. Sometime over the past year in fact, U.K. IT managers became much more willing to try new technologies. For example, an astounding 41.3% of U.K. respondents indicated significant use of object-oriented programming. By contrast, only 13.3% of worldwide respondents indicated significant use, and only 11.3% of U.S. respondents indicated significant use.

Whether this jump is due to an improved economic outlook (particularly vis a vis the rest of Europe) or a fundamental and as yet unknown philosophical change will not be known for at least another year. Decreasing economic prospects and the specter of a longer and deeper recession probably explain the sudden Japanese and German drops.

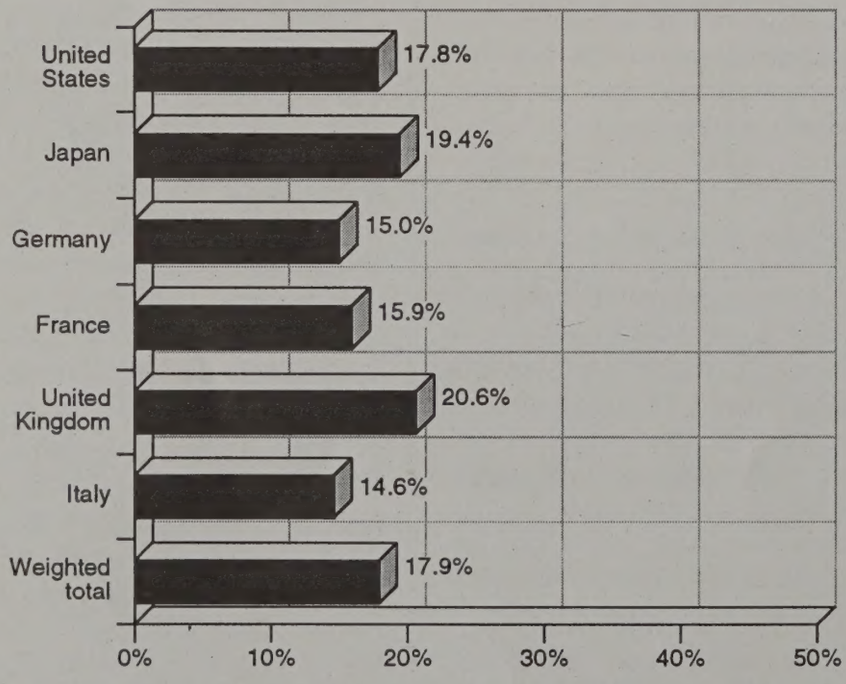
Key IT Focus: Improving Organization's Competitiveness



Share of country market that considers developing and/or implementing strategic applications to improve the organization's competitiveness to be the most important area of IT focus over the next 12 months

Source: IDC, 1993

Key IT Focus: Controlling Costs



Share of country market that considers controlling costs and improving the financial justification for continued IS investment to be the most important area of IT focus over the next 12 months

Source: IDC, 1993

Enthusiasm for new technology may be quickly dampened during times of less-than-encouraging economic outlook.

Respondents in the United States maintained the highest expected use of new technologies. The U.S. is much more enthusiastic about image processing, CD/ROMs, CASE, EDI, RAID, and multiprotocol routers than the other countries.

Their enthusiasm for new technology, however, is not absolute. In many cases U.S. respondents are committing to "exploratory" use of new technologies, rather than "significant" use of them. For example, fully 42.7% of U.S. respondents indicated an exploratory use of object-oriented programming (compared to 33.8% worldwide). Only 11.3% committed to significant use of OOP (compared to 13.3% worldwide).

Japan remains far behind other respondents in several new technologies. Slightly over one-half of all Japanese respondents have no plans to use electronic mail. By contrast, over two-thirds of worldwide respondents have indicated either exploratory or significant use of e-mail. In the United States, over 80% of respondents plan e-mail use. And, only 20% of Japanese respondents expected to use or test EDI, compared with over 50% of their counterparts worldwide.

In general, however, France and Italy remain the least committed to installing and testing new technology. France lags behind the other countries in using and exploring use of pen computers, image processing, multimedia applications, object-oriented programming, Unix workstations, groupware, and RAID. Italy has the least zealous respondents when it comes to the use of CASE and multi-protocol routers.

Technology Directions and Individual Countries

Information systems managers around the world have always had lots of options. Major decisions and budget dollars (or lira, yen, etc.) have always been based on a variety of computer architectures, types of operating systems, and networking strategies.

Yet never before have IS managers encounter such a diverse range of technological options for their processing needs. Today's IS managers survey suppliers trying to sell them on solutions that range from mainframes and proprietary minicomputers to open systems, client/server solutions, and LANs.

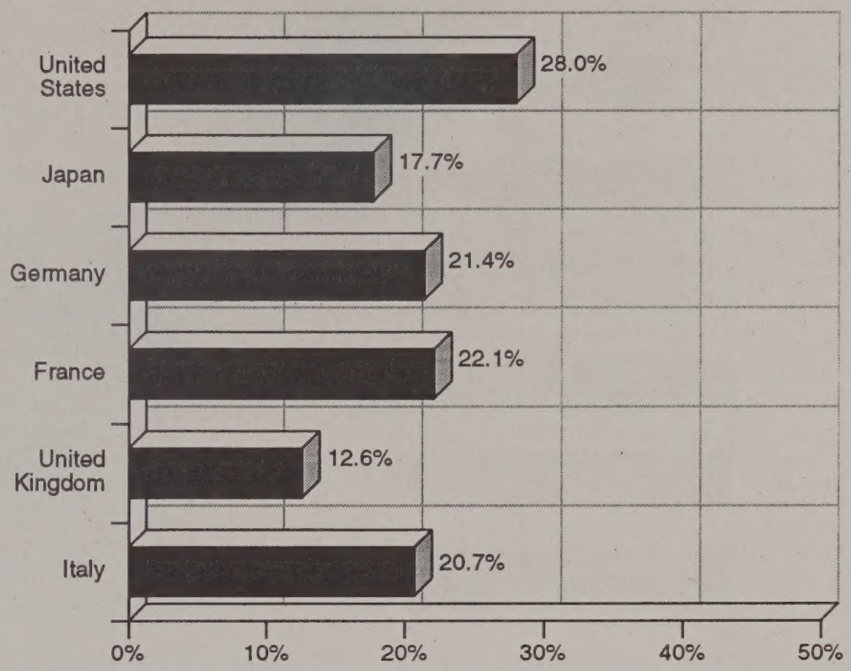
The technology is the same everywhere, nevertheless, the historical applicability of these options has varied around the world. For example, mainframes have traditionally been very popular in hierarchically structured Japanese organizations; personal computers and PC LANs have not. Unix-based solutions have become very popular in the U.K. — much more so than in any other country in Europe or around the world.

These unique national predispositions toward specific technologies may be changing, thanks to the continued development of international standards and the relentless climb of microprocessor-based servers and network-based systems. The six countries studied in these surveys appear to be coalescing around a similar (if still very broad) model of IT expectations, usage, and planning.

Multiuser System Capacity

Very few sites are planning to reduce mainframe and minicomputer processing capacity in

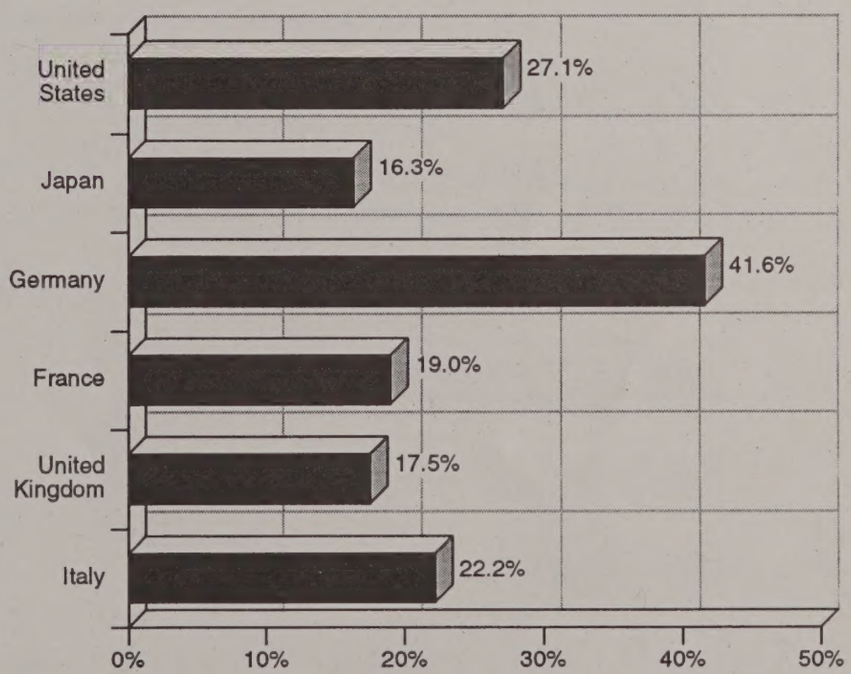
Key IT Focus: Migrating to More Modern Platforms



Share of country market that considers migration from older technologies to more modern hardware and/or software platforms to be the most important area of IT focus over the next 12 months

Source: IDC, 1993

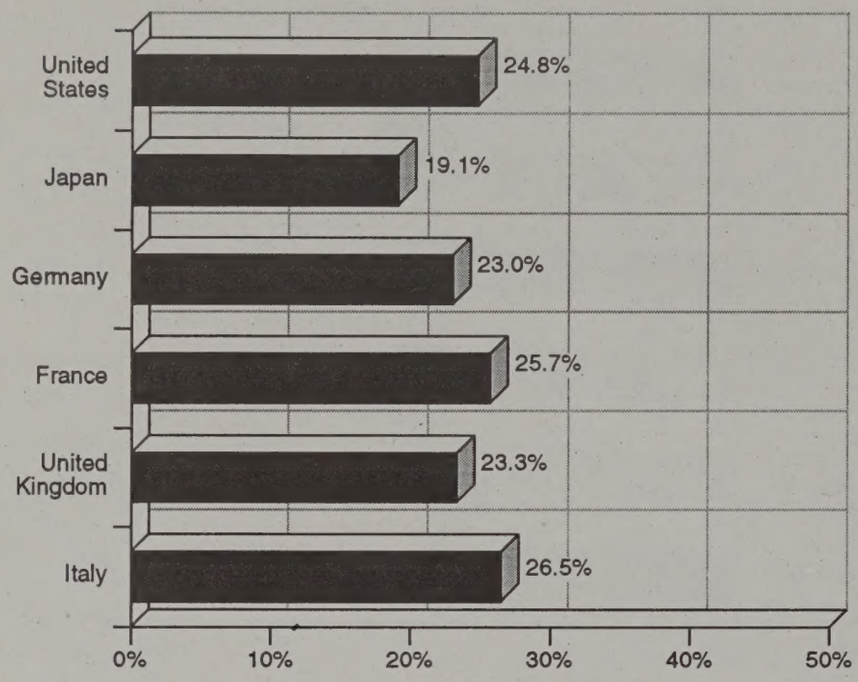
Key IT Spending: Hardware, Software, and Services



Share of country market that characterizes its overall IT spending as heavy investment in hardware, software and services to meet rapidly growing needs

Source: IDC, 1993

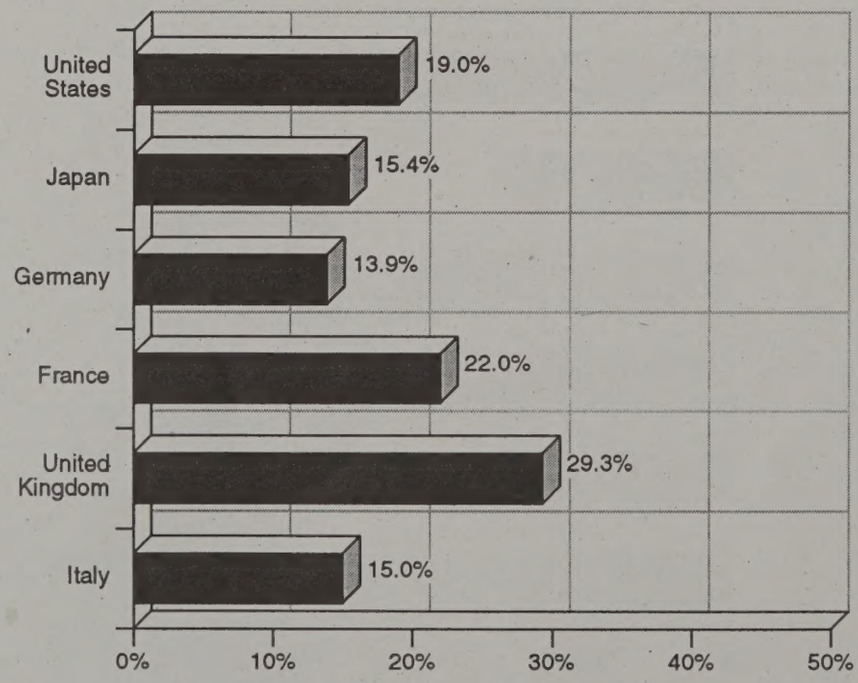
Key IT Spending: Software and Services



Share of country market that characterizes its overall IT spending as investment mostly in software and services

Source: IDC, 1993

Key IT Spending: Network Capabilities



Share of country market that characterizes its overall IT spending as primarily focused on developing its network capabilities

Source: IDC, 1993

1993 from 1992 levels. Almost one-half (48.4%) of sites expect increased mainframe and minicomputer processing in 1993, and 43.9% expect it to stay the same. Only 4.4% expect overall mainframe and minicomputer processing capacity to decrease.

Japanese respondents, however, plan to invest in mainframe and minicomputer processing-capacity increases far less often than any other country. Less than one-quarter of the Japanese sites plan mainframe or minicomputer increases. It appears that this is one area Japanese respondents have targeted in their efforts to control costs.

Satisfaction with Primary Vendor

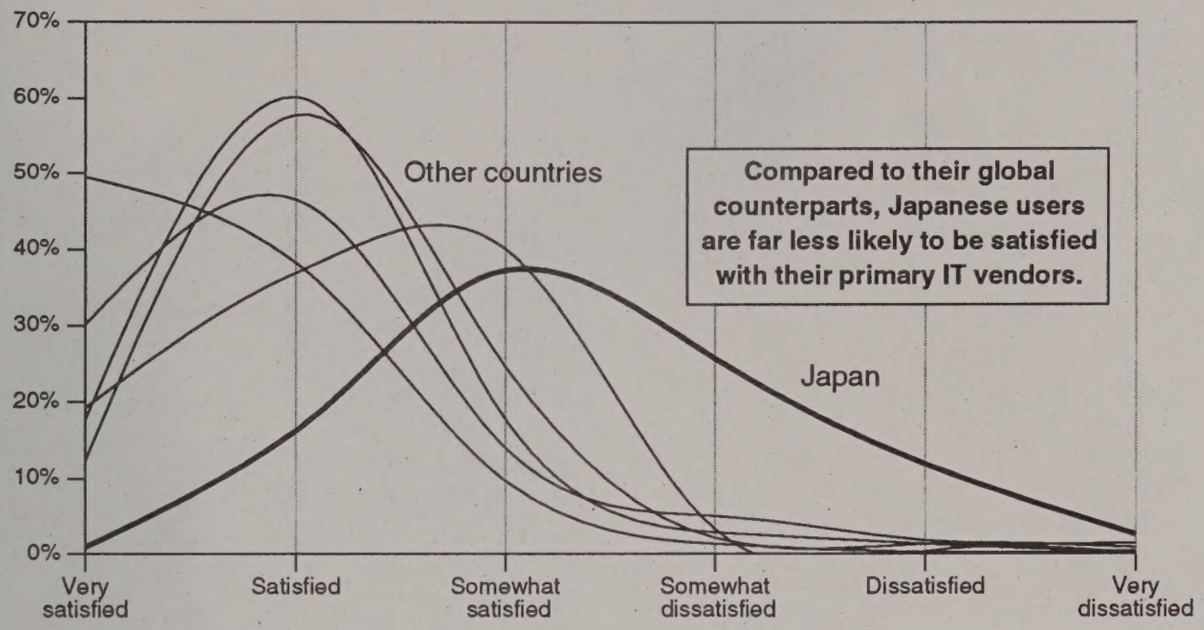
The countries surveyed have broadly similar levels of satisfaction with the primary IT vendors with two notable exceptions — Japan and the U.K..

The differences are most striking in Japan. To put it mildly, Japanese IT users are mad. Only 18.0% are either "very satisfied" or "satisfied" with their IT suppliers. Another 37.3% are "somewhat satisfied" while fully 40.2% are either "somewhat," "very" or just "dissatisfied."

The most plausible explanation for the lack of satisfaction is Japan's historical reliance on proprietary solutions. This has several facets ranging from Japan's use of proprietary multiuser systems to its reliance on a nonstandard PC architecture.

One component of the lack of satisfaction has to be Japan's inability to participate fully in the PC revolution. Only 15.9% of Japanese respondents reported their purchase plans were affected by rap-

IT Users in Japan Are Less Satisfied with Their Primary Vendors



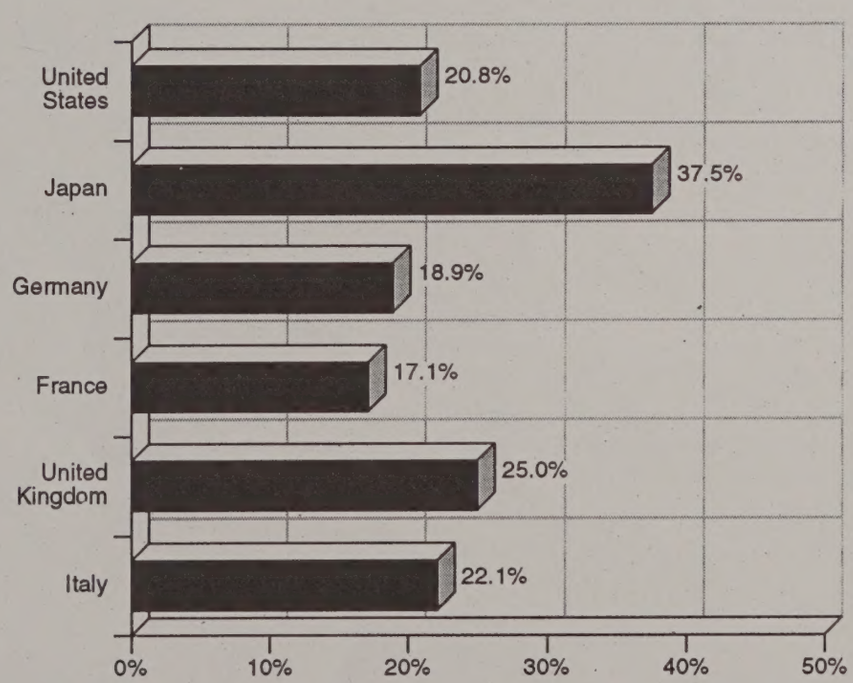
Satisfaction level with primary vendor's ability to help meet technological or business requirements

Source: IDC, 1993

idly falling PC prices. Even in Italy, with the next-lowest response, 35.8% of respondents' plans were affected. Throughout the rest of Europe almost one-half of all respondents adjusted their PC buying plans because of falling prices.

On the other side of the coin, respondents in the United Kingdom are unusually pleased with the results provided by their primary IT supplier. It is tempting to oversimplify the connection between satisfaction and Unix usage. Can it be that the many advertised benefits of open systems — freedom of choice, simplified ports, simplified distributed computing, better price/performance — are truly resulting in happier customers?

Key IT Spending: No Major Growth



Share of country market that expects no major growth in its overall IT spending

Source: IDC, 1993

CEOs Around the World Still Expect More from Information Technology

The dialogue between IS professionals and top corporate management has in recent years become even more critical to the future of information technology. Global recession, the shift towards the desktop and individual end users, and increasing debate about the nature and extent of the payback from IT have combined to focus attention on the CEOs and CFOs who bear ultimate responsibility for IT budgets and decision-making.

As the rapid forced turnover in CIOs in many companies testifies, corporate management, which itself often stands at risk in today's environment, is taking that responsibility seriously.

An important component of IDC's Global IT Survey this year has been to review the relationships between CEOs/CIOs and their centralized IS organizations and suppliers and to examine CEOs' and CIOs' understanding of IT terminology across the six countries.

Centralized IS

Approximately 90% of the survey base stated that its organization has a centralized MIS group. It was then asked to characterize the influence of its MIS group on the company's overall information technology strategy. Over two-thirds of the CEO/CFO respondents rated MIS at least a major influencer, with a quarter citing MIS as the primary influencer. However, another quarter felt that influence was distributed much more broadly through the corporation.

Nearly half stated that MIS influence is increasing, while only 12% saw it decreasing. Nevertheless, there are some significant variations by country. CEOs and CFOs in Japan, perhaps as a reflection of the greater degree to which IS executives there are included on corporate governing boards, are much more likely than elsewhere to view central IS influence as increasing, while French and British corporate leaders are more likely to see MIS influence as declining.

Vendor Relationships

If the dialogue about the proper directions for IT between CEOs/CFOs and IS executives is developing a consensus of views, the dialogue between CEOs/CFOs and their primary IT suppliers could often bear improvement.

CEOs/CFOs were typically "somewhat satisfied," but CEOs and CFOs in Japan and France expressed varying levels of dissatisfaction with their primary IT vendor that suggest that traditional relationships are very much at risk.

Computer Industry Terminology

Respondents in all countries except France were asked whether they were familiar with seven terms denoting key strategic IT issues of the 1990s: open systems, downsizing, enterprise-wide networking, business process redesign, data center outsourcing, network outsourcing, and software development outsourcing.

A large majority stated that they were familiar with all seven terms. Japanese and German CEOs/CFOs tend to be more familiar (or at least to claim familiarity) with IT terminology than their peers in the U.S., U.K., and Italy.

IT Payback

CEOs and CFOs are reasonably satisfied with what they have received so far. There were, however, significant disparities between countries. Japanese respondents were much more likely than their counterparts in the U.S. and Europe to rate IT a significant source of competitive advantage, while over two-fifths of French CEOs/CFOs cited a mixed record with IT spending or expressed disappointment with the return on their IT investment.

Moreover, the future will not necessarily depend on past success. The underlying message from the rest of the survey is that CEOs and CFOs expect even more from their IS organizations and their vendors — and if they don't receive it, so much the worse for them and for the IT industry as a whole.

THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR JUNE 4, 1993 VOL. 28, NO. 14 Published continuously since 1964.

NT Announcement Fallout: 32-Bit OS Competition Heats Up, DOS/Windows Growth to Slow

IBM's 1992 release of OS/2 2.0 and Microsoft's NT announcement signal the onset of the second major phase in corporate microcomputing. The introduction of 32-bit operating systems heralds far greater functionality and wider use for fast, low-cost microprocessor-based computer systems.

Competition surrounding the new operating systems will draw only slightly on past industry models. For example, the most critical characteristic of this second phase will be the mass migration of applications from one platform to another, rather than the creation of a new market.

Of perhaps even greater interest is that this migration is from traditional, proprietary systems to high-performance, robust networks of low-end microcomputers. The idea of replacing mainframe or proprietary systems with powerful networks has been a popular dream for years. The goal: to reduce mainframe expenses and to reduce software development expense and backlog. In 1991 simple client/server applications that allowed desktop systems to access centralized file servers began to appear. However, these applications run under 16-bit operating systems, rendering them neither robust nor fast enough for enterprise computing demands.

In 1992, IBM's OS/2 2.0, the first 32-bit operating system, was widely available. In 1993 this migration trend will accelerate with the delivery of Windows NT. In this issue of the *Gray Sheet* we examine NT's prospects from three angles: as heir to the Windows mantle, as a threat to the commercial midrange, and as an alternative technology at Unix sites.

IN THIS ISSUE:

NT Announcement Fallout: 32-Bit OS Competition Heats Up, Windows Growth Slows 1
Desktop OS Market Summary: The Second Phase Begins 1
Don't Expect an NT Revolution in Commercial Midrange Systems Markets 3
IDC Analysis 4
Windows NT as a Rightsizing Tool: Too Early to Be Called a Unix Killer 6
NT Waffling May Result from Too Many Choices at Microsoft 8

Desktop OS Market Summary: The Second Phase Begins

While 1992 was the beginning of a new phase of industry competition, 32-bit operating systems (OS) didn't account for a large share of overall OS shipments. From a purely product standpoint, 1992 was "the year of Windows." Over 10 million Windows units were shipped. The key factor was the widespread availability of hundreds of new Windows applica-

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tions, which had been under development since 1991.

Nineteen ninety-three will be the year of the 32-bit operating system. OS/2 will continue its momentum with respectable, if not spectacular, increase in sales. Sales will be bolstered by a boost in the number of applications that take full advantage of the "WorkPlace Shell" user interface in OS/2. Although many applications run in the 32-bit mode under OS/2, relatively few take full advantage of the system's impressive object-oriented desktop metaphor.

Windows NT is intended to provide advanced desktop users with the full suite of robustness enhancements connected with the use of the 386 architecture. It also provides compatibility from old DOS and Windows-based applications to the 32-bit world. The server edition of NT isn't scheduled to ship until late this year and so remains more difficult to judge; however, the client version of Windows NT will sell well over its first 12 months.

In addition to name recognition and the market clout provided by a huge customer base, Windows NT has the following advantages:

- Microsoft will do whatever is necessary to ensure that 12-month shipment volumes for NT exceed those of OS/2 2.0 in order to secure bragging rights as the 32-bit OS of choice.
- A two-tiered strategy will keep retail prices fairly high, but will give OEMs an opportunity to license NT and gain higher margins if they bundle it with their hardware.
- Windows NT, at $250 retail list, is priced low enough to be within reach and yet high enough to represent something completely new.

By contrast, NT also has several shortcomings, including these:

- Quality questions still plague NT. The March beta release contained well-publicized bugs that have been fixed. How many more less-apparent bugs remain?
- NT will require about 200MB of disk and 12–16MB of RAM — that's more than a simple upgrade for the vast majority of installed PCs.
- Some sales of the NT client (available soon) will be postponed until the server version (available in 1994) is shipping. The key question: what proportion of NT's Gee whiz! is best featured in network applications?

— Brent Williams of IDC's PC Software Research Group contributed to this article.

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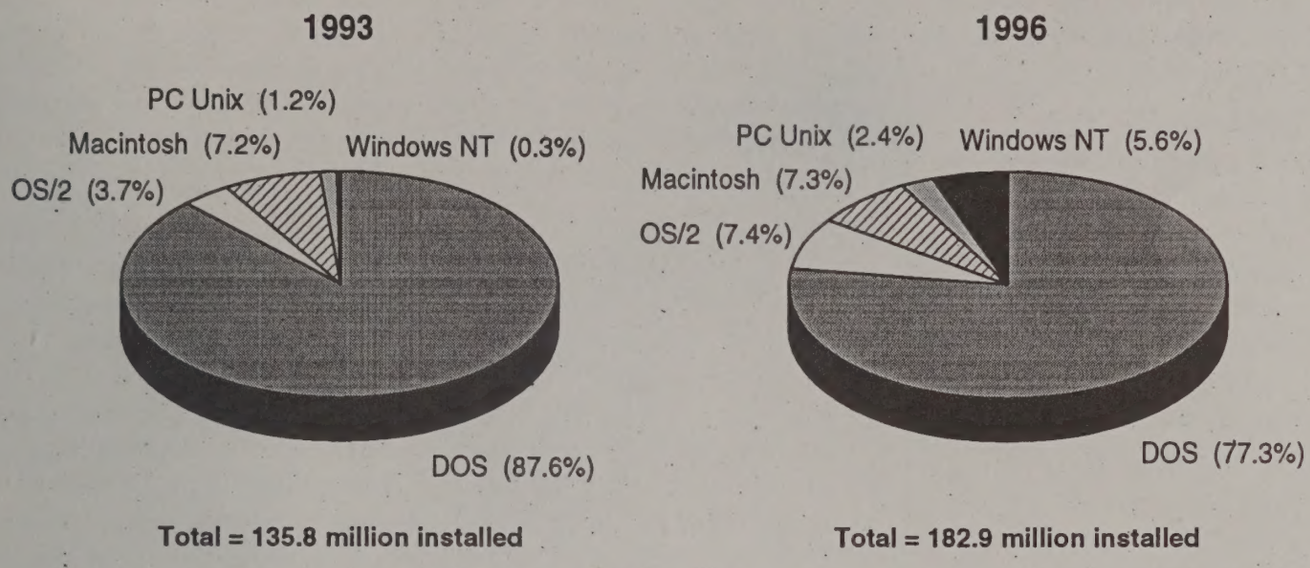
Worldwide Operating System Installed Base, Retail and OEM Channels, 1990–1996 (000)



Source: IDC, 1993

Don't Expect an NT Revolution in Commercial Midrange Systems Markets

NT will have a relatively insignificant impact (compared to desktops) on the commercial midrange systems market until 1995 at the earliest. Even then, NT will affect the market primarily as a client, not as a server. Problems stemming from a poorly focused marketing strategy, not technology, appear to be at the heart of Microsoft's Windows NT challenge.

Windows NT is the industry's best kept secret since the AS/400. However, unlike the AS/400, which started with modest expectations and has been an unqualified market success, Windows NT is likely to underperform many aggressively optimistic forecasts. We note the following:

- Although Windows NT has numerous potential markets, IDC believes the product initially will achieve greatest success when preinstalled on new shipments of large Intel i486- and Pentium-based PCs through OEM channels.
- Windows NT is late. Currently, it is in an advanced beta test stage. The desktop version is to be announced during the current quarter and ship in volume during 1993. We do not expect Windows NT server function to ship until mid-1994.
- Windows NT initially will be less successful as (1) a DOS-upgrade sold through retail channels; (2) a driver of alternative, non-Intel desktop architectures (including Alpha from DEC and MIPS from SGI); (3) a server network operating system sold through any channel; or (4) a low-end, terminal-oriented multiuser operating system sold beneath specific application software through the VAR channel.
- Software houses in technical markets seem to be moving to NT much more aggressively than those in commercial markets.
- Microsoft's Windows NT commercial midrange systems marketing strategy remains confusing. We are encouraged that Microsoft continues to make incremental enhancements to their rollout plans as they test new ideas. We are concerned, however, that despite these improvements, Microsoft's NT marketing strategy still seems more appropriate for a piece of application software than a piece of complex system software. The company could sell (and has done so) Windows as a desktop utility application; it is unlikely that it can sell the much more complex and expensive NT using the same strategy.
- However, Microsoft's market power will make Windows NT among the most widely installed 32-bit operating system on the desktop.

According to IDC's current unit shipment estimates, it will outship Unix in 1994 and OS/2 in 1996.

- Windows NT will underperform expectations as a server in multiuser client/server environments. Novell's NetWare, Unix, and a handful of other traditional multiuser operating systems are better positioned to exploit client/server market opportunities.
- Although Windows NT initially may not realize its advance billing in the commercial midrange systems marketplace, it will definitely generate significant downward pressure on multiuser software pricing.

IDC Analysis

With Windows NT, Microsoft is once again attempting to enter the arena for commercial, multiuser-grade system software. Previous attempts, including OS/2 LAN Manager, multiuser OS/2 (with Citrix) and various database management thrusts, have failed. Based on Microsoft's behavior to date, we believe that NT initially will have only marginally better success as a server.

Microsoft certainly has a number of advantages as it attempts to leap the multiuser system software market's entry barriers: (1) ready access to cash and capital; (2) powerful brand names; (3) no vested interest in maintaining high prices for system software; (4) limited allegiance to any particular hardware platform; (5) fragmented opposition; and (6) sweeping changes in industry structure that could favor the company.

Nevertheless, other issues dominate Microsoft's advantages. First, it will have difficulty leveraging its vaunted applications software marketing capabilities. Even if Microsoft were to restrict support of its applications to NT, the company's share of the overall applications market is not enough to force customers to NT. Moreover, its application competencies clearly are strongest on the desktop, not the midrange.

Second, because Microsoft's DOS distribution system is primarily oriented to the single-user market, the opportunity to piggyback NT server distribution on DOS channels is limited. Yet Microsoft's distribution system continues to be oriented to moving single-user applications and DOS upgrades. The company hasn't built a distribution infrastructure capable of selling, deploying, and supporting complex multiuser-grade system software. Indeed, this is the primary reason Windows NT will be most successful on the desktop: that's where Microsoft's channels lead.

Third, Novell has a long history of successfully executing strategic initiatives in the space Microsoft wants to attack. Although opposition is fragmented, Novell has demonstrated incredible focus over the years. Novell's market position, and its ability to retaliate against Microsoft, will be enhanced dramatically as it (1) integrates Unix Software Labs into its organization and (2) continues to grab greater market share from traditional midrange companies.

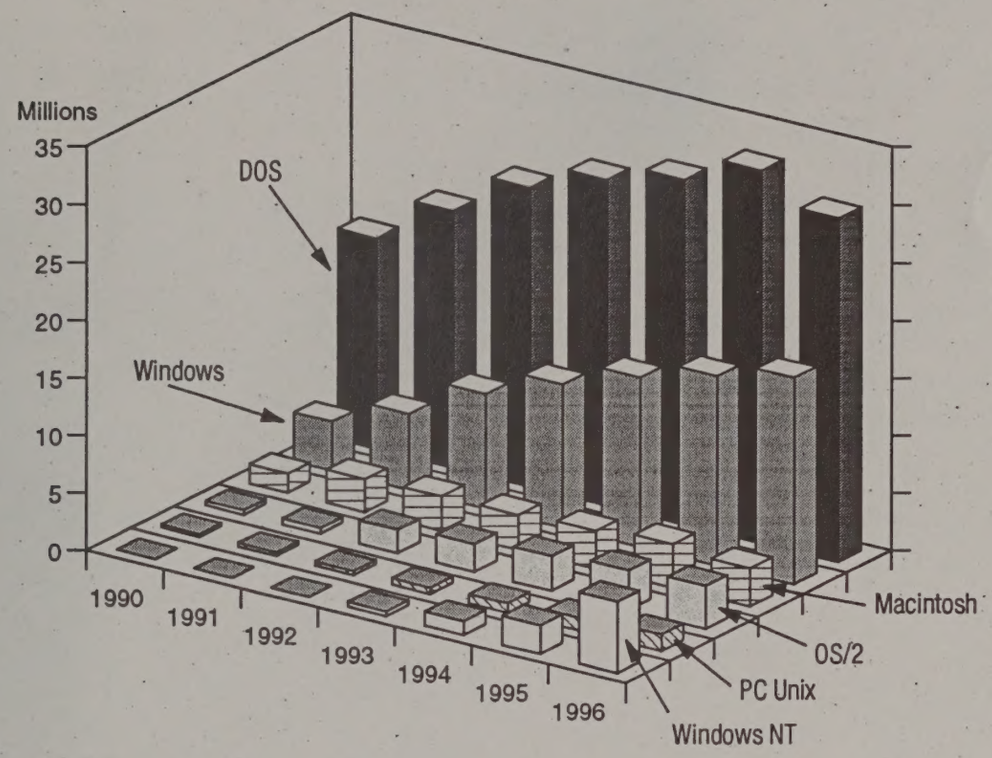
Fourth, although DOS enjoys the widest application software support in the industry, this support is entirely oriented to single-user applications. Many traditional multiuser software houses are promising Windows NT versions of their applications, but it will be quite some time before this support is broad based. For instance, it is very unlikely that Windows NT will sport thousands of applications when the server version is announced, as was the case with the AS/400.

Finally, there is no compelling need for Windows NT in the commercial midrange systems marketplace. Windows NT does not appear to offer any radical innovations of the type required to pull commercial midrange systems customers from Unix, NetWare, or other viable midrange operating environments. Moreover, IDC research shows that the attractiveness of a single, unified, desktop-to-data-center operating system is overrated. Customers buy a variety of platforms because they perceive themselves as having to satisfy a variety of needs.

Nonetheless, Microsoft's entrance will have important impacts on the commercial midrange systems market. A few of the most likely are the following:

- Multiuser software pricing structures will come under attack. Microsoft will use price — and pricing schemes — to enter the market. Thus, Microsoft could (1) severely disrupt the pricing umbrellas traditionally established by operating system software and (2) establish a new, user-oriented reference model for software pricing in general.
- Opposition will attempt to coalesce around specific issues, technologies, or companies. The first example of this, of course, was COSE. We expect numerous other instances of this type of behavior over the next few years.

Worldwide Operating System Shipments, Retail and OEM Channels, 1990–1996



Source: IDC, 1993

- Greater exploitation of "mass" media to establish, or defend, industry positions. End users, although disenfranchised, are gaining strength as a powerful procurement force in the industry. Microsoft needs to consolidate its end-user constituency if it is to effectively leverage the DOS franchise to sell Windows NT as a commercial operating system. Mass media will be required to enfranchise end-user masses. Microsoft's competitors very likely will have to use similar media channels to reach and sway end users. Mass marketing skills are going to become more critical after the arrival of Windows NT.
- Greater opportunity for Novell. Microsoft won't be able to maintain a proprietary hold over any benefits that flow from its Windows NT client/server market development activities. Moreover, because Microsoft's distribution infrastructure is not tuned to the multiuser market, we aren't convinced it will be positioned to efficiently harvest new opportunities at all. Novell, on the other hand, has a history of turning any opportunity to its advantages. Microsoft's market development work will negatively impact traditional minicomputer and mainframe products, but Novell may end up as the biggest beneficiary.
- A new set of client "standards" to accommodate. Microsoft very likely will try to differentiate Windows NT from other DOS or Windows products by adding specific functions, perhaps like systems management. Desktop success for Windows NT will require server system software suppliers to incorporate support for these features and functions into their desktop interoperability products.
- Reformation of software/hardware vendor relationships. Windows NT is an attractive target for many independent software vendors (ISVs). However, falling software prices, uncertain futures for marginal system software bases, and rapidly changing industry structures increase the investment risks faced by ISVs. For many ISVs, Windows

NT support will require strategies for exiting one or more current markets.

Windows NT will have its greatest success on the desktop, but won't overrun the multiuser server market. Nonetheless, Windows NT will impact the commercial midrange systems market in a number of critical ways. Of particular significance, Windows NT will force major changes in software pricing schemes and levels. Also, we believe Windows NT will emerge as a leading client operating system, with differentiated features, that will have to be supported by server products.

Among the areas where Microsoft could significantly strengthen NT are these:

- Microsoft demonstrates a better focus on the server capabilities of Windows NT.
- Microsoft develops a broad distribution structure capable of moving complex system software.
- Microsoft creates enormous market pull by bundling dramatically new function into Windows NT in such a way that it can be easily exploited by relatively unsophisticated buyers.
- Novell loses focus and cannot execute on its NetWare 4.0 "LAN integration" strategy.

— Peter Burris and Susan Frankle of IDC's Systems Research Group contributed to this article.

Windows NT as a Rightsizing Tool: Too Early to Be Called a Unix Killer

Unix is one of the most popular target platforms in users' rightsizing/downsizing strategies — a potentially very important use of NT. Many Unix users have already made strategic commitments to downsizing. They have shown a willingness to test new technology. In addition to being a natural target for Microsoft's NT sales team, Unix user attitudes toward NT may provide an early indication of NT's prospects.

So, are Unix users incorporating NT into their long-range plans? According to recent surveys of 150 Unix sites, the answer is a guarded yes (*IDC Windows NT Impact Survey* — contact IDC for additional information).

When respondents were asked if they planned to evaluate new operating systems, 31% indicated they did. Of those, Windows was the most popular response. However, when all other flavors of Unix were combined, it was mentioned twice as frequently as NT.

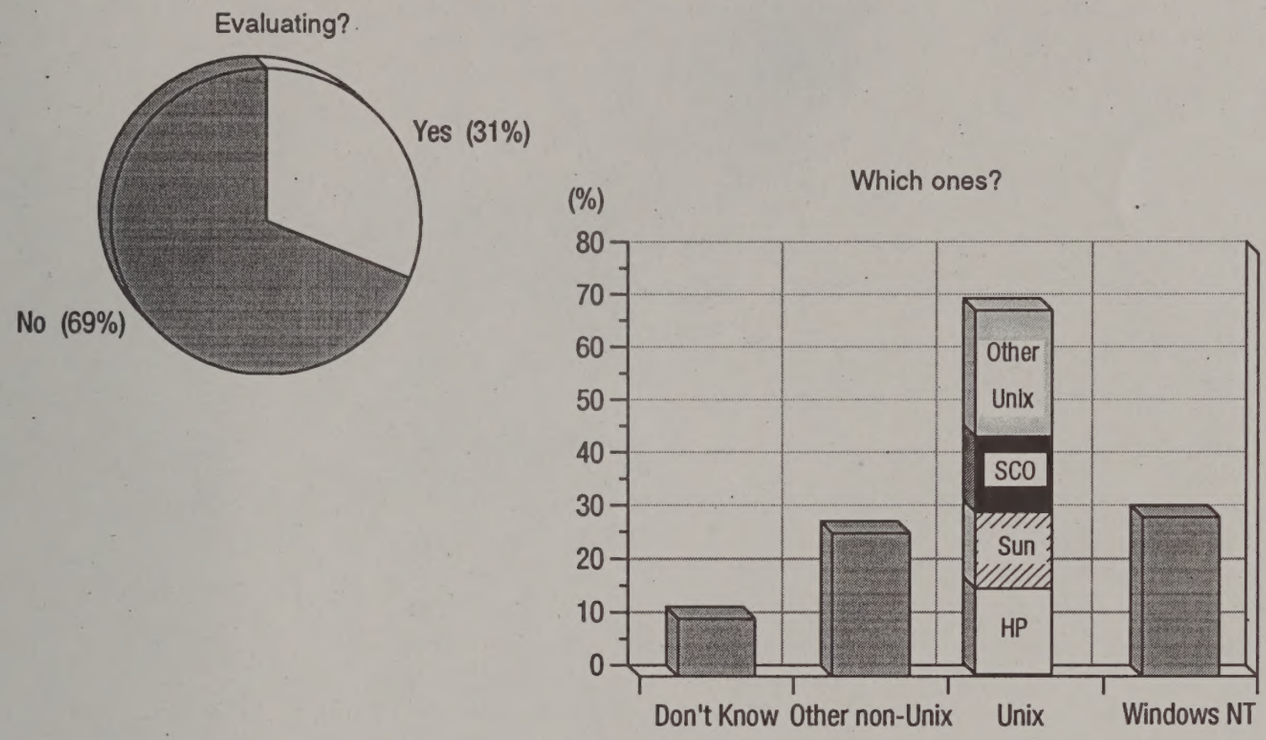
In addition, several questions were aimed at determining the importance of a single operation system at a site. One of the reasons Windows NT may be successful is the opportunity to eliminate multiple operating systems, reducing system complexity, and increasing scalability of applications.

Approximately 41% of the respondents indicated they were committed to a single operating system. Of those, over 90% indicated it was Unix. NT was not mentioned.

These results indicate that at Unix sites there is tremendous interest in evaluating NT. Not surprisingly, nobody is willing to commit to it. The interest is no doubt due to the near-universal name recognition of Microsoft products, but in order to capitalize on that great advantage, Microsoft has a one- or two-year window of opportunity. If NT is to become the platform of choice among rightsizers/downsizers, Microsoft will need to get a robust, proven product into the hands of these potential customers who know the company, understand the technology, and are willing to test the products.

Evaluation of New Operating Systems

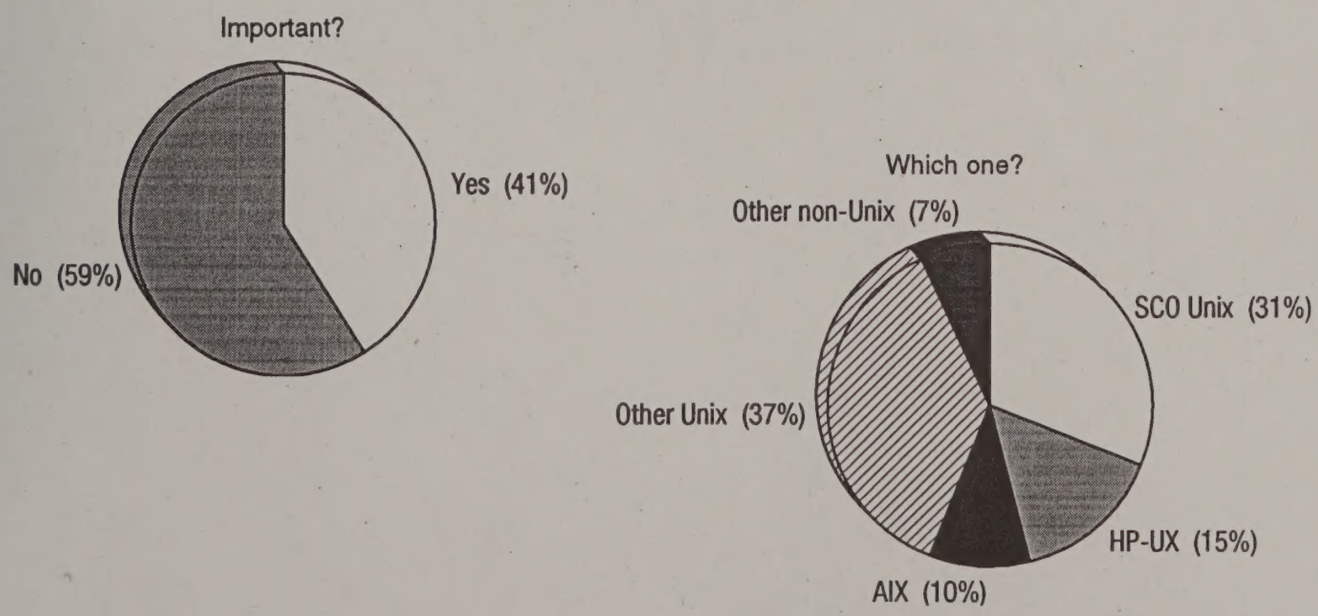
Q. Do you plan to evaluate any new operating systems in the near future? If so, which ones?



N = 150
Multiple responses allowed.
Source: IDC Windows NT Impact Survey, U.S. Commercial Unix Users, 1993

Importance of a Single Operating System

Q. Is a single operating system important to you? If so, which one?



N = 150
Source: IDC Windows NT Impact Survey, U.S. Commercial Unix Users, 1993

NT Waffling May Result from Too Many Choices at Microsoft

Where NT will sell best — as a high end or mass-market client, as a server alternative to proprietary midrange systems — or something in between like a Novell killer? The answer is best understood in the context of Microsoft's long-term strategic decision making and an analysis of its single distinctive advantage — the installed base of Windows and DOS users.

In addition to its bread-and-butter single-user-system software and applications market, Microsoft appears to covet the next two big computing waves: client/server (downsizing enterprise information systems and applications onto LANs and servers) and consumer multimedia systems software. Do both (if possible), one, or neither provide Microsoft an opportunity to grow well into the next millennium? Should Microsoft go up or down?

The downsizing/midrange market is much closer to Microsoft's core markets. A 60% share (Microsoft's share of the Windows applications markets) of the entire midrange applications market is a huge opportunity. But it's not easy: supporting LAN-based mission-critical applications is a lot harder than single applications on a PC. Thirty-two-bit NT will be more robust than Novell and may be a good solution over time. The key question: when will NT own enough of the midrange to give Microsoft an advantage when it comes to writing whole client/server applications?

That may explain why NT has suffered with a muddled marketing message. The last thing Microsoft wanted was to threaten the Windows cash cow with an ill-prepared NT. But the NT server still won't be released for some time (beginning of 1994?). So Microsoft, wanting the best of both worlds, decided to release the NT client and spend most of its time talking about NT the server. This way it doesn't get blasted for another delay.

In truth, if all NT does is keep Unix and Novell off the desktop, it's a success. Microsoft's goal is to protect today's revenue streams and expand into new markets. The moral of the story: confusing marketing works . . . when you're Microsoft.

What about Microsoft efforts expanding down, into the consumer electronics side of the business? Microsoft does not yet appear ready to give it up to Apple and/or Kaleida, despite Apple's considerable momentum. Microsoft will probably attempt to carve out a role as a multimedia server hosting several multimedia clients.

Owning the server side of a multimedia network (with NT), however, does not necessarily help Microsoft build the best consumer TV/PC interface. So, its efforts at building a multimedia GUI will largely proceed on their own. Chicago, Microsoft's next Intel desktop environment (which is said to have 80% of NT's features) will probably be part of the answer.

Of perhaps even greater question is whether Microsoft has the resources and clout to address both new markets concurrently. If so, how? If not, which is the best bet for the company? Either way Microsoft faces a dilemma.

Microsoft is better positioned to move up the market — into server and midrange applications — but it may not go that way. The consumer multimedia side of the business can be very distracting. These kinds of distractions may well spawn internecine battles at Microsoft. Should they become heated enough, they may answer the question of whether Microsoft becomes the AT&T, or the Western Union, of the information age.

PC Review and Forecast

THE GRAY SHEET
Computer Industry
REPORT

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Worldwide PC Market: The Search for Growth

William J. Manning, Guest Editor

The global PC industry has reached a state of maturity, even momentary stasis, characterized by high-volume, lower-margin dynamics. Success in the marketplace is largely determined by the ability to competitively design, source, manufacture, deliver and price products. Not surprising in this competitive environment, the worldwide vendor ranks are consolidating. In addition to consolidation, IDC expects to see increased emphasis on high-growth regions such as Latin America in the short term as vendors look for payback niches.

The 1992 worldwide PC market reached 29.6 million unit shipments, up 14.4% from 1990. The dollar value of shipments rose a slight 4.7% as price erosion swept across the worldwide PC marketplace. The installed base of PCs reached 138.0 million units. Demand for PCs was driven by first-time PC purchases in many markets, replacement purchases, purchases of portable PCs, increased penetration to household and small business markets, new channels of distribution, and the growing popularity of Microsoft's Windows 3.X.

IDC projects that the worldwide PC market will grow at nearly the same pace in 1993 as in 1992. Unit shipments are forecast to increase 13.7% to 33.7 million units over the previous year. The dollar value of shipments is pegged at $67.7 billion, up a modest 7.7% from last year due to continued price slashing and the availability of low-priced chips. By 1996, IDC estimates that worldwide unit shipments will grow to 43.6 million with an accompanying dollar value of $84.8 billion.

The relative stability of the worldwide PC market will be affected by a series of shorter- and longer-term push/pull factors. In the short term, the following will accelerate growth:

- Greater affordability brought about by global price wars
- The popularity of notebook and subnotebook PCs
- Microsoft's Windows, which has breathed new life into Intel-based systems and DOS software applications
- Growing expansion in ROW markets, especially countries in Latin America and the Pacific Rim

IN THIS ISSUE:

Worldwide PC Market: The Search for Growth 1
United States 2
Western Europe 3
Japan 5
ROW 5
Profiles of Leading PC Suppliers 6
IBM 6
Compaq 6
Apple 6
AST Research 7
Diversification Favors Industry Heavyweights 8

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- Expansion in the home PC market, and the complementary consumer distribution channels
- Improved pricing of PC applications software and peripherals
- The continued proliferation of networking

In the short term, IDC predicts the following could inhibit growth in the worldwide PC market:

- Worldwide economic woes, which, although abating somewhat in the United States, have taken firm hold in Western Europe and Japan
- PC market maturation and saturation
- Slow development of promising but unpredictable third-world markets
- Personnel and operations cutbacks of major corporations
- Inability to penetrate small business, education, and household markets outside major mature geographic markets (e.g., United States, Western Europe, Japan)

In the long term (1995–1996), IDC predicts the following should accelerate growth in the worldwide PC market:

- High-performance processors including Intel's Pentium and lower-cost RISC alternatives
- The emergence of complementary, new-function, pocket-sized mobile PCs
- Wireless communications technologies and networks
- Upgrade purchases and downsizing
- The realization of multimedia

In the long term, IDC predicts the following could inhibit growth in the worldwide PC market:

- The emergence of competing hand-held computers
- The availability of digital information and entertainment services on different devices including television
- Increased saturation in established markets
- Saturation of large new geographic markets
- Low growth rates due to market maturity, with no new large geographic growth markets to offset it

Not surprisingly, this range of stimuli will take affect at different rates in the world's PC markets. Following are regional analyses of PC markets in 1992 and forecasts for 1993.

United States: Moderate 1993 Growth after a Wild 1992

In 1992 PC shipments grew a startling 16.5% to 11.4 million units, up from 9.8 million in 1991. By contrast, the 1990–1991 increase in unit shipments was a paltry 3.3%. Due to continued price wars, total U.S. dollar value told a more modest story, growing 7.0% to $24.0 billion. Still, this performance compares favorably to the 4.2% dollar value decline experienced in the 1990–1991 period.

After a sluggish first half of 1992, the U.S. market exploded in the second half. The buying boom that began in mid-1992 was triggered by several events: an easing of the U.S. recession; Intel's historic price drop on microprocessor prices; the popularity of Windows; Compaq's aggressive pricing on new low-end products; the convergence of unprecedented low prices with the rise of the cost-conscious small-office/home-office (SOHO) market; and rapid expansion in alternate channels of distribution.

Despite astounding market growth in the fourth quarter — which is actually benefiting only a small group of PC system companies — the market mood is one of nervous optimism. There is a feeling that the market may be skittish, prone to fluctuation and unpredictability. This impression stems from the huge jump in short-term demand and the uneven pace of some vendors' performance.

A continuation in the demand surge is expected to provide growth in PC units of 15.4% in 1993. Despite a moderation in the PC price wars, the value of unit shipments is forecast to grow only 3.8% year-to-year. IDC believes that the surge in demand — albeit temporary — will be compacted into a 12–18-month time frame that started in mid-1992.

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Worldwide Intel-Based PC Shipments (000), 1990 and 1996

1990

Processor	United States	Western Europe	Japan	Rest of World	Worldwide
80386SX	2,119	1,360	348	592	4,419
80386	1,801	856	334	352	3,343
80486SX	0	0	0	0	0
80486	103	61	1	10	175

1996

Processor	United States	Western Europe	Japan	Rest of World	Worldwide
80386SX	364	390	0	885	1,639
80386	0	0	0	147	147
80486SX	3,619	3,704	1,861	3,480	12,664
80486	4,436	4,204	874	3,698	13,212

Source: International Data Corporation, 1993

IDC has increased its forecast for the U.S. market in 1993 from its initial outlook based on the following factors:

- Stronger-than-expected unit growth in 1Q 1993. In particular, sequential unit jumps in Q1 1992 for players such as Zeos, Acer, and ALR are indicators that the market is still booming.
- Strong new product cycles from IBM, Compaq, HP, and Toshiba in Q2 and early Q3.
- The large installed base of PCs purchased in the mid and late 1980s that need to be upgraded.
- The ongoing price competition between vendors. This competition provides better and better value for buyers.
- The declining cost of multimedia PCs.
- A broadening of the PC feature set embodied in the declining cost of sound cards and CD-ROM drives. In addition, innovative technologies are converging on PCs, including infrared communications, PCMCIA, and voice (phone).
- Expansion of consumer-focused distribution channels.

IDC believes the forceful dynamics that have been fueling the U.S. buying spree will continue throughout 1993. It is doubtful, however, that the huge growth percentage experienced in the second half of 1992 will be duplicated in 1993. By then, the market will have absorbed significant new product cycles from high-growth vendors including Apple, IBM, and Compaq. In addition, these vendors will have fulfilled to a large extent their distribution channel expansion plans.

The late 1992 boom is a temporary phenomenon. The market should return to growth rates that reflect the mature state of the PC market. The psychological drawing power of the PC price war brought about by its widespread coverage will diminish, and the pace of upgrade buying may moderate.

Western Europe: Sluggish Economics Cloud PC Picture

In Western Europe, shipments rose a robust 12.4% from 1991 to 1992, with total volume at 9.8 million units. Major factors here adding to the unit growth in 1992 were changes in replacement cycles, resulting in users viewing PCs as having lower worth. First, older PCs are now likely to be totally replaced rather than upgraded, because falling prices make replacement more attractive. Second, the impact of major brand names coming back into broader user segments and channels of the PC markets has also had an upward impact upon demand.

The most significant announcements in 1992 undoubtedly came from Compaq, which launched the largest amount of product from any single vendor in the PC market at one time over the year. However, equally of significance were announcements from IBM/ICPI (Ambra), Apple, ZDS, Hewlett-Packard, and IBM itself. A greater number of PCs were shipped in the second half of the year than usual, due mainly to the impact of Prolinea and Ambra in June and Valuepoint in October. Major European players like IBM, Compaq, and Olivetti shipped well over 35% of their PCs in the last quarter alone.

In 1992, significantly lower prices combined with a rapidly aging installed base to accelerate PC replacement across Europe.

Worldwide Personal Computer Market, 1990–1996

	Shipments (000)	Installed Base (000)	Value of Shipments ($)	Annual Growth in Value (%)
		United States		
1990	9,553	53,432	23,396	N/A
1991	9,820	58,425	22,422	-4.2
1992	11,442	64,006	23,922	6.7
1993	13,204	70,381	24,936	4.2
1994	14,223	76,761	26,361	5.7
1995	14,833	83,195	27,555	4.5
1996	15,185	89,617	29,433	6.8
		International		
1990	14,279	53,871	37,672	N/A
1991	16,047	62,829	37,586	-0.2
1992	18,138	73,953	38,918	3.5
1993	20,441	86,255	42,777	9.9
1994	23,467	100,855	46,897	9.6
1995	26,023	116,520	51,427	9.7
1996	28,445	133,786	55,337	7.6
		Worldwide		
1990	23,832	107,303	61,068	N/A
1991	25,867	121,255	60,008	-1.7
1992	29,580	137,959	62,840	4.7
1993	33,645	156,636	67,713	7.7
1994	37,689	177,616	73,258	8.2
1995	40,855	199,715	78,982	7.8
1996	43,631	223,403	84,770	7.3

Note: Data presented here represents the latest outlook and forecasts from IDC researchers covering the Japanese, U.S., and Western European PC markets. In a departure from previous studies, data presented includes only PCs; no single-user workstations are included. In past studies single-user workstations were combined with PCs.

Source: International Data Corporation, 1993

IDC believes that, in the 1992 business market, replacement cycles for PCs were shortened by one-third. Changes of this nature affect the short-term trends in significant ways, but ultimately the replacement cycle returns to a settled position again once the user community becomes used to such lower prices. IDC's European forecast for 1993 expects an increase in sales activity in the first half before dying down again as the summer progresses.

Nineteen ninety-two saw the home/hobby computer market develop into a significant segment in Europe. With 33% of the units going into this sector in 1992, the share of home/hobby sales in the United Kingdom, Germany, and France was a large element. Over time, the home/hobby market in other countries will begin to develop, and the share of the market will gradually rise to almost 40% in 1997.

The development of alternative distribution channels, and in particular the continued expansion of the German vendor-owned stores (Vobis and Escom), will play a crucial role in how this sector develops, and who will become the major players.

Vobis is really like the European version of Gateway 2000: a fast-growing, price-oriented vendor with ownership of its distribution channel (a network of company-owned stores). Last year was another strong year for this German vendor as its position in Europe grew. The company's shipments rose to 389,000 units, up nearly 60% from 1991. Vobis remained strong in its core country market while expanding into France and the United Kingdom.

The success of this vendor has been built foremost on its ability to get low-price PCs to consumers in a way that mirrors the linkage of superstores and direct-response channels to the U.S. consumer and home office markets.

More subdued growth awaits the Western European PC market in 1993 as the spurt of growth seen in many countries at the end of 1992 loses momentum. IDC believes the recent growth was caused by a number of factors that combined to pull in unit demand ahead of time. The combination of inexpensive high-performance computers, broader availability, and a variety of major and minor brands affected the rate at which users were replacing their installed PCs. These PCs would have been installed at a later date, and so the forecast dips slightly in 1993 as this replacement cycle returns to more "normal" conditions.

PC purchases in the next year will be moderated by the European business climate. Economic forecasts across Europe continue to be pessimistic, with most of the major economies anticipating further declines or flat performances. The situation in Germany, as usual, remains the most critical factor to the European market as a whole. When and to what extent the German economy returns to growth affects a large number of the smaller Western European countries through its trade links and its position as a large export market to other Western economies.

In terms of value, 1992's PC market continued to fall, but with accelerated unit shipments, the fall was less than previously forecast. Indeed, 1992 has seen the last of the margin being extracted from the PC market sales process. All the major vendors and channel players are now running lean, and 1993 PC prices are not set to mirror their 1992 falls. PC prices over 1993 will begin to resume a more "normal" curve against the falling prices of their components. These changes in pricing structure in 1993 will result in a slight increase in the value of the PC market for 1993, after two consecutive years of decline.

Japan: Price Wars May Escalate

The Japanese 1992 PC marketplace reflected the country's sluggish economy. Unit shipments of PCs in Japan declined 2.9% 1991–1992, with total unit volume at 2.2 million units. Due to a more austere outlook, Japanese manufacturers cut back on overseas development and further dampened consumer confidence.

U.S.-based manufacturers continued their drive into the Japanese market, which continued to be dominated by domestic manufacturers, and exported the price war as part of an effort to cut into their market share. However, the price war had limited effect on the market in 1992.

The Japanese market should rebound in 1993 with unit growth projected at 15.2% and volume at 2.5 million units. Other factors behind the upward growth trend in the Japanese PC market were the burgeoning market for multimedia PCs, the escalating price war introduced by U.S. vendors Dell and Compaq, the introduction of Windows, the computerization of public elementary and junior high schools, and the replacement of 8- and 16-bit systems by 80486 PCs.

ROW: Huge Growth to Continue

In 1992, PC shipments for the rest of the world (ROW) increased a cumulative 21.1% in 1991–1992 to 6.2 million units, the value of shipments rose 20.1% to $9.8 billion. Within this group of nations, Latin America is forecast by IDC researchers to be the fastest-growing region in the ROW group of markets with an increase in unit volume of 28.5% 1991–1992. The major country markets in Latin America-Mexico, Brazil, and Argentina are estimated to have grown above 20.0% in units last year.

In the Asia Pacific region, the latest IDC research shows unit growth of 18.6%, with Thailand and Malaysia the hottest growth countries. Korea and Australia are the two largest country markets with 1992 shipments in both geographies at almost 700,000 units. In the other major ROW country market, Canada, unit shipments hit 905,000 units, up 13.3% over 1991 levels.

ROW is the fastest-growing geographic category, with unit growth pegged at 20.3% for 1993 and dollar value at 18.5%. Latin America is again expected to be the high-growth region in 1993, with unit growth projected at

24.0%. An indicator of the growing importance of this region is the fact that in 1993 the value of shipments in the Mexican market is projected to climb above $1 billion. Mexico will join Australia and Canada as the other billion dollar country PC markets in the ROW group. In Asia Pacific, unit growth is expected to moderate to 14.0%, with Thailand and Malaysia again growing at the highest rate. Unit growth in Canada is expected to slow to about 8.0% in 1993.

Profiles of Leading PC Suppliers

IBM PC Company

Reinvigorated by newfound autonomy and flexibility, the IBM PC Company held onto its top spot in the worldwide PC unit-share rankings. During the year, the company's market performance fluctuated widely as it moved to quickly regain its competitiveness in a fast-moving global marketplace. By the end of 1992, IBM emerged as a lean and focused competitor boasting strong new offerings in the notebook and desktop product arenas. In the fourth calendar quarter, it shipped a record 1.4 million units worldwide.

In a market it previously had dominated, IBM has seen its powerful position steadily deteriorate. IBM's vulnerability was due largely to the availability of 386/486 PC technology to a massive number of aggressive and hungry companies and IBM's inability to read or respond in a timely manner to a transformed marketplace. The company that created the PC market and helped to forge its destiny no longer had a central role. It was becoming increasingly marginalized.

IBM's response to increasing pressures has been to move the PC division away from the bulk of the company, with the aim of making up the lost ground as rapidly as possible. The launch of ICPI, and the later Valuepoint range, has been a measured response to the new worldwide PC business. Technology advancement is not new to IBM, and the company will continue to advance technology as before. What IDC believes will be new is IBM's commitment to getting such technology to market in a timely and affordable fashion.

Compaq

Compaq also reemerged in 1992 on the strength of fresh management and new products. Savaged in recent years by lower-priced competitors such as Dell and AST Research, Compaq turned the tables with its own aggressive price cuts. Compaq broke from its premium price mold in the summer of 1992 with the launch of its Prolinea and Contura lines. The significance of these two product launches cannot be understated. From mid-year on, the company went into a steep growth ascent, with unit shipments in the last quarter of 1992 hitting 600,000. The new Compaq enjoyed the biggest gain in market share and unit volume of any PC player worldwide.

Compaq made huge gains in unit volume and market share in the two primary markets — the United States and Western Europe. In America, the vendor's shipments rose from 390,000 in 1991 to 653,000 in 1992, which accounted for a market share increase from 4.0% to 5.7%. In Europe, shipments rose from 425,000 to 609,000, boosting market share to 6.2%.

In key ROW markets, Compaq had strong years in Canada and Australia. Compaq also expanded into the Japanese market with the launch of low-cost machines. While the company has attracted much attention, its efforts have yet to provide much payback. In Japan in 1992, the vendor is estimated by IDC to have shipped only 11,000 units.

Apple

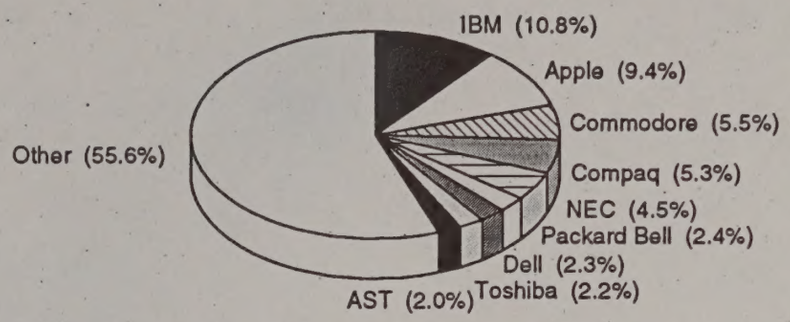
On a worldwide basis, Apple's Macintosh volume grew to 2.8 million units. Apple's story was consistent unit growth in all quarters of calendar year 1992, and broader worldwide distribution. Like the other two veteran PC suppliers, Apple showed a willingness to play in the low end of the U.S. market. Internationally, the company improved its competitive position as it grew market share in some regions and launched new notebook products as well as consumer-focused desktops.

In the United States, Apple was neck-and-neck in the unit market-share race with IBM, finishing just barely ahead of IBM PC Company for the year. The company benefited by the second-half buying boom in the United States, where Apple undertook a rapid expansion into mass-merchant channels

of distribution. Apple's Performa line proved successful, and its Powerbook (the industry's most successful brand in 1992) continued a strong market showing, accounting for about 15% of all Apple systems shipped worldwide.

In Japan, according to IDC researchers there, Apple emerged as the number two player in unit market share as shipments climbed to nearly 200,000 units. In Europe, Apple maintained a high level of growth in 1992, with shipments rising 12% to 666,000 units. Much of Apple's growth over Europe has come from its continued expansion into the consumer markets and its strong base of "creative" workers.

1992 Worldwide Vendor Share of PC Shipments



Total units = 29,580,000

Source: International Data Corporation, 1993

AST Research

Along with Compaq, Dell, Gateway 2000, and Vobis, AST emerged as one of the market's high flyers in 1992. The company's unit volume jumped 54% to nearly 600,000 units, and revenue for the year rose above $1 billion. In the United States, which accounted for 54% of AST's worldwide volume, the company shipped 322,000 PCs. The vendor's success is tied to an ever-stronger brand image in high-performance and value PCs and notebooks. In addition, it has a strong channel portfolio that concentrates on dealers and VARs in the United States. The company's proposed acquisition of Tandy expands AST's notebook lineup and opens the door to the consumer market.

AST has a solid geographic mix with a firm presence in the United States, Europe, Hong Kong, and Canada. The company has also launched PCs in Japan with lackluster results; shipments hit only 2,000 units in 1992. AST now has 35 international sales offices and subsidiaries, and AST products are sold in over 100 countries.

(Information in this issue was excerpted from reports generated by IDC's PC Hardware Program. For more information please contact Bruce Stephen, 508-935-4269.)

1992 Worldwide PC Shipments (000) and Vendor Shares by Region

	United States	Western Europe	Japan	Rest of World	Worldwide	Worldwide (%)
IBM	1,402	1,079	174	545	3,200	10.8
Apple	1,528	666	191	395	2,780	9.4
Commodore	82	1,236	0	307	1,625	5.5
Compaq	675	609	11	260	1,555	5.3
NEC	173	5	1,126	41	1,345	4.6
Packard Bell	592	100	0	8	700	2.4
Dell	452	203	2	18	675	2.3
Toshiba	245	198	131	76	650	2.2
AST	322	178	2	92	594	2.0
Other	5,971	5,495	536	4,455	16,456	55.6
Total	11,442	9,768	2,173	6,197	29,580	100.0

Source: International Data Corporation, 1993

Diversification Favors Industry Heavyweights

Identifying PC winners and losers used to be much easier. It was IBM and Apple; then IBM, Apple, and Compaq. Toshiba eventually laid claim to the portable market. Maturity and increasing complexity confused the picture. In the current worldwide PC market, judging success or failure requires a more complicated deliberation of specific market segments and shipment types. Analysis must also focus on value-added activities, specific geographic strategy, and a wide range of distribution and marketing strategies.

The results of any single analysis will paint an accurate but limited picture. NEC dominates the Japanese market, but struggles elsewhere. Compaq successfully challenged IBM in the corporate market, but proved vulnerable in lower-priced mass markets.

One measure offers a simple, yet unequivocal, appraisal in any era: overall financial performance. Prolonged financial decline and its attendant layoffs, reorganizations, and relocations typically wrapped in prolonged bad news can erode brand image and further abrade performance. The stable vendors like Compaq are those that can keep financial troubles short term. In Compaq's relatively quick turnaround lies a key to success in the industry: diversification. Compaq aggressively attacked market segments that it had failed to meet and expanded its international reach. Increasingly, it has become clear that the vendors best positioned to survive the current wave of industry turmoil and consolidation generally have a diversified portfolio of products, geographic markets, distribution channels, business models, and an established worldwide brand image.

Broad diversification, coupled with lightning-quick flexibility is critical. The ability to diversify has proven advantageous to the established vendors. They are typically already strong in multiple areas and have the financial strength to address others. Major vendors are also showing a surprising ability to adapt. Compaq brought in a new management team. IBM handed off responsibility to a dedicated PC division.

To more effectively gauge the impact of diversification, IDC's PC analysts have developed two methods for assessing PC vendor performance. The first is called WOTS analysis: Weaknesses, Opportunities, Threats, and Strengths. The second employs a report card grading system that measures performance in areas such as brand image, channels of distribution, affordable products, business model, global market coverage, and momentum.

If we apply the feedback from both models, it is clear that diversification is critical to success. The ability to diversify in the short term is key to players such as Packard Bell, Gateway 2000, and Vobis, whose competitive turf is increasingly under attack by the high-growth, broad-line suppliers. Gateway 2000 has risen rapidly due to its singular focus, but future growth is contingent on diversity, both geographic and channel. In the future, vendors with strategies that are more singly focused will have a battle on their hands fending off the growing presence of market-dominant players.

Users, as usual, have the final word. The viability of the supplying vendor is increasingly a heavily weighted factor in the purchase commitment. The fallout from the price wars of the past year or more implies that very little separates multiple vendors in terms of price. Other comparative issues have become magnified. Foremost among these are worldwide market coverage, diversified channels of distribution (particularly in the United States, but on the rise in Europe), capital to finance expansion and absorb margin erosion, and the ability to meet shorter product cycles. The integration of these diverse and related elements will determine vendor viability in the years ahead.

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Taiwan's PC Realignment Highlights New Industry Competition

Price cuts spelled trouble for the Taiwanese computer industry in 1992. Taiwan's manufacturing cost advantages had been lost to a host of Asian countries — Malaysia, Singapore, and Thailand, most notably — several years ago. Suppliers that had built businesses based on low-cost production faced intense margin pressure; dozens of small manufacturers failed. Medium-sized companies scrambled to refocus, and the largest Taiwanese suppliers suffered losses and considerable growing pains.

Nonetheless, 1993 finds many Taiwanese component and PC suppliers strong, and getting stronger. How? Consider the following:

- More capable engineering. Taiwanese companies are more willing and able to design new features into PCs and components rather than just reverse engineering widely available features and functions. In Taipei, taking an engineering drawing from concept to volume production (at competitive, not leading, prices) takes less time (as little as six months) than anywhere in the world.
- More flexible manufacturing strategy. Taiwanese companies will, more and more, only be designing and mocking-up motherboards, subsystems and PCs. The manufacturing of the products will be exported to lower-cost regions. The net: Taiwan is losing PC manufacturing jobs, but that may not be so bad.
- Pragmatic marketing. Now that PCs with globally recognized brand names are price competitive with no-name clones, a non-OEM distribution strategy no longer may be viable for smaller suppliers. Only the largest Taiwanese-based suppliers — Acer, Mitac and Tatung — can afford a global brand name. Smaller companies are becoming more aggressive in courting international OEM accounts.
- New businesses. Reflecting trends in the systems business, component margins are also tightening. So while well-known assemblers and distributors of PCs and PC products are not the only industry companies feeling the pinch, many systems suppliers are shifting into providing a steadily changing mix of peripherals, components, and subassemblies. The key: moving into hot market niches (486 motherboards, 14" monitors, for example) before they cool.

IN THIS ISSUE:

Taiwan's PC Realignment Highlights New Industry Competition 1

Asian Pacific Demand for IT 3

Under the Cover: Taiwanese Companies Supplying More Than Components 4

Offshore Flight: Taiwanese Manufacturers Have Moved Production Facilities to Find Less Expensive Labor and to Get Closer to Customers 5

Profiles of Leading Taiwanese PC Hardware Companies 6

How Low-Cost, Efficient Producers Can Profit on the Way to the Future 8

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Despite the intensity of the global price competition, Taiwanese suppliers continue to grow. The value of PC systems exports grew by 14% between 1991 and 1992, while the number of units exported grew by 5%.

The picture is even rosier for motherboards, other components, and peripherals. From 1991 to 1992 Taiwanese motherboard exports grew 4.0 million to 5.5 million units (from $830 million to $980 million in revenue). Motherboard exports are expected to grow by 9% in 1993.

The peripheral business is becoming increasingly important for Taiwan. Over the past year it shot past South Korea as the largest supplier of monitors and now holds approximately 60% of the worldwide monitor market.

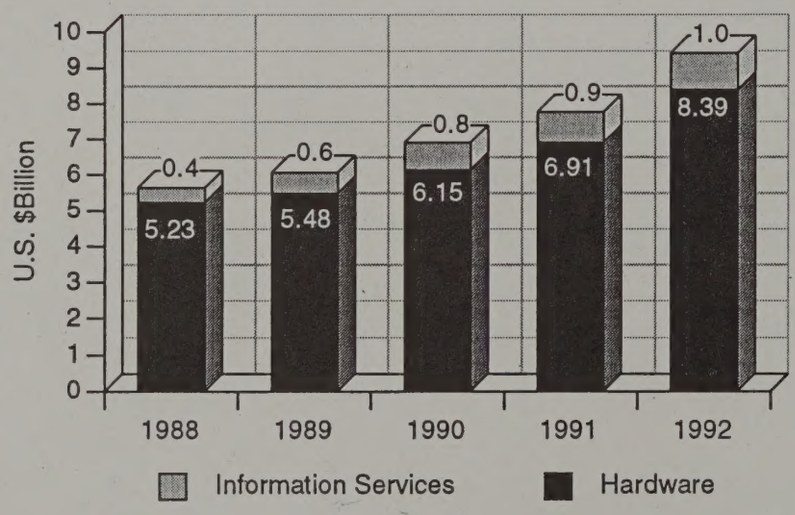
Despite lower-cost competitors, Taiwanese-based companies will remain a significant factor as the PC industry matures. Three trends will continue to dominate: tightening margins (across the board), shortening life cycles, and the increasing need for rapid turnaround from design to volume production.

Smaller manufacturers will be most susceptible to margin pressure. But they are also best suited to provide rapid service to international OEM accounts. The ratio of major OEM contracts with smaller, as opposed to larger, Taiwanese and Asian suppliers will likely swing in response to this trade-off.

Evidence of such a trend is rather clear. Many small manufacturers were forced out of business over the past 12 months as prices dropped. Meanwhile, Acer and other larger manufacturers have won major OEM deals with aggressive pricing that they were able to sustain thanks to longer production runs and volume purchasing.

As greater emphasis swings back to time-to-market and features-oriented competition, then, larger suppliers may suffer. Tracking the results of their non-OEM businesses will be particularly important over the next 12 to 18 months. Those revenue streams may prove to be critical to their long-term success.

Annual Production Value of Taiwan's Information Industry, 1988–1992



Taiwanese companies have steadily increased their production of IT hardware and software/services since 1988. Much of the growth comes from exports, which account for 95% of all revenue. In addition, exports continue to grow far faster than domestic consumption (see pp. 4 and 5).

Source: MIC, III, 1993

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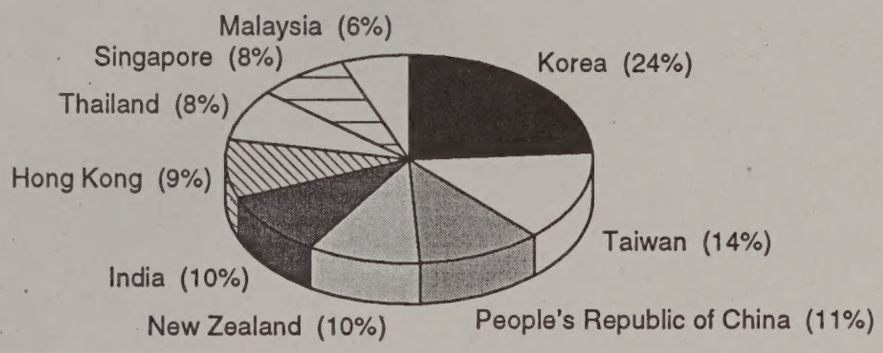
Asian Pacific Demand for IT

Much of the analysis in this issue of the *Gray Sheet* is focused on Taiwanese suppliers of PC technology. The Asia/Pacific market for IT is — at $9 billion and growing strong, according to IDC's Asian Research Center — another story. Korea and Taiwan are the dominant countries in the region. And both are growing faster than the worldwide average. Many IT suppliers are looking at the huge potentials of India and China. Most recently, Compaq has established sales operations in China. Although the potential for sales in these less-developed nations is clearly long term, the payoff might be huge enough to warrant the expense.

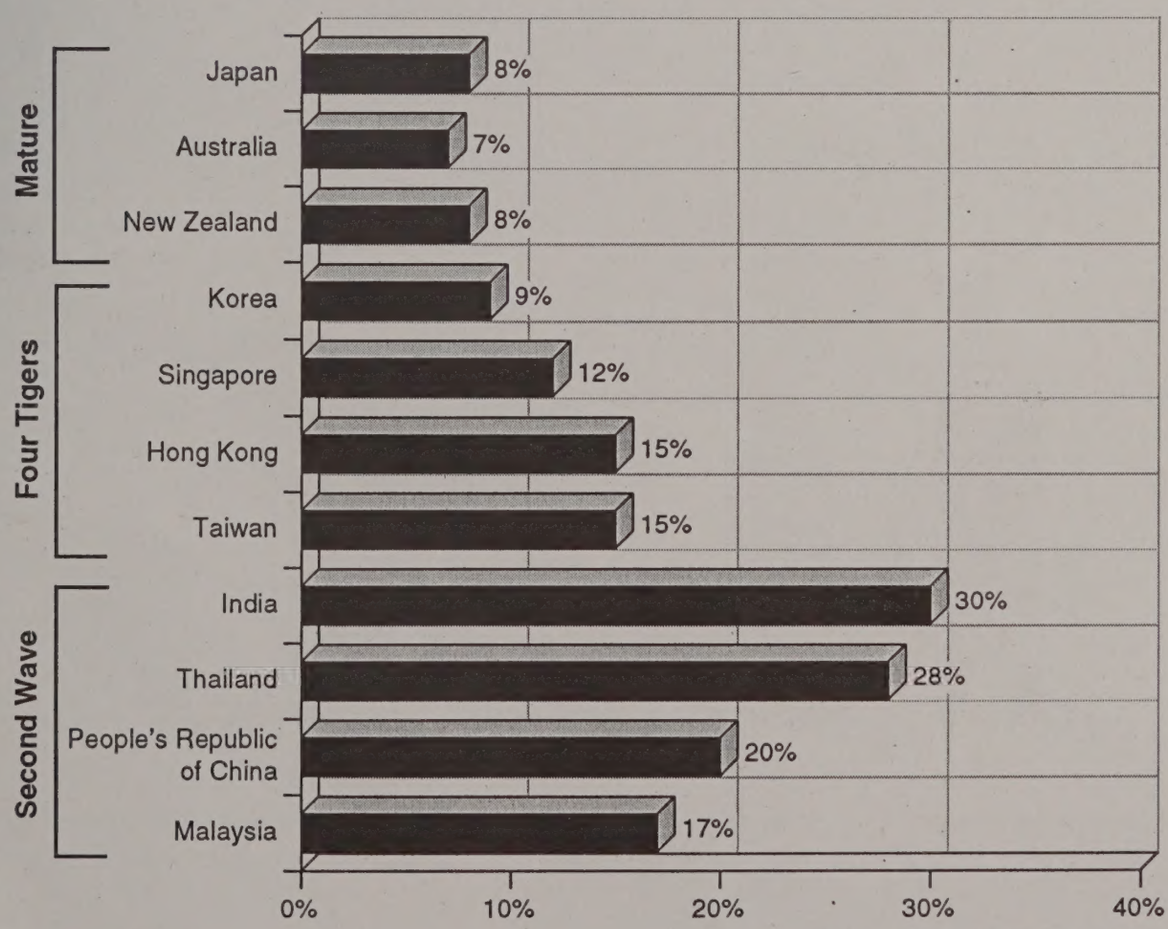
1992 Asia/Pacific IT Market by Country



Total = $9 billion

Source: IDC Asian Research Center, 1993

Asia/Pacific IT Growth Rates by Country, 1991–1996



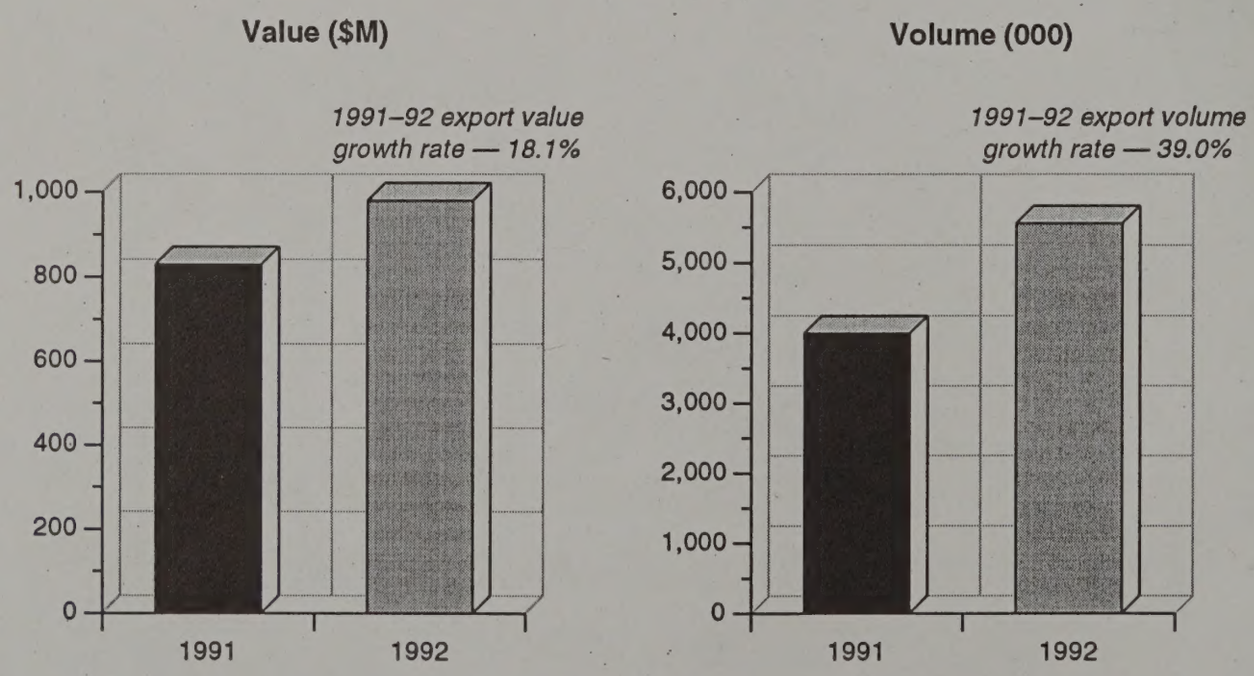
Source: IDC Asian Research Center, 1993

Under the Cover: Taiwanese Companies Supplying More Than Components

One result of the global PC price war has been major systems suppliers' and marketers' increasing willingness to purchase OEMed components and systems. Following is a partial list of some of the more notable OEM/supplier arrangements with major Taiwanese companies.

Company	OEM Arrangements
Acer Inc.	Manufactures systems for Alcatel, Apple (PowerBook 145), AT&T, Fujitsu, Mitsui group, SNI, Unisys, and others
ADI	Compaq monitors
Chicony	(PowerBooks soon?)
Datatech	IBM motherboards
First International Computer	NCR motherboards, Dell scanners
Inventec	Dell notebooks
Tatung	Packard-Bell desktop PCs; Apple and IBM monitors
Twinhead	Notebooks for CompUSA, Sharp; (PowerBooks soon?)

Motherboard Production and Export Status in 1992



Motherboard production in Taiwan is growing by leaps and bounds. Not surprisingly though, unit volume (right) is growing far faster than the value of motherboards produced (left).

Source: MIC, III, 1993

Offshore Flight: Taiwanese Manufacturers Have Moved Production Facilities to Find Less Expensive Labor and to Get Closer to Customers

Taiwanese manufacturers are moving in two directions. Manufacturing and production facilities are spreading across Asia, while assembly and sales operations are moving closer to customers, most notably in Europe.

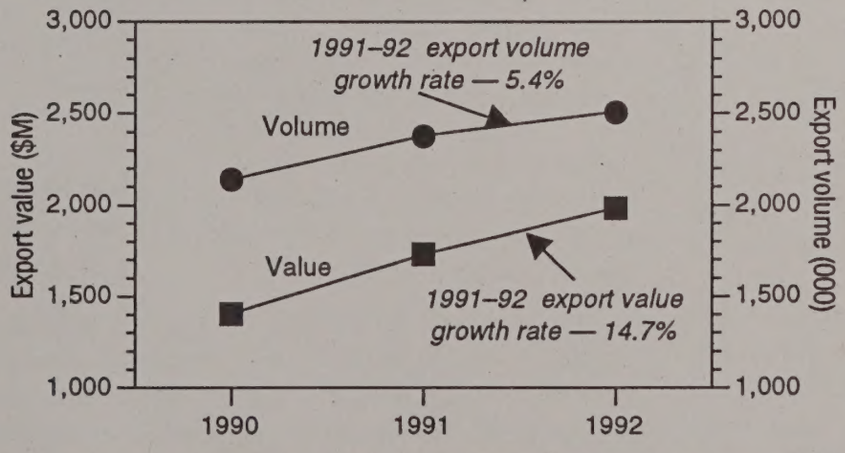
Cost pressures have forced Taiwanese-based manufacturers to find less expensive labor and production facilities. The most popular site is Thailand, followed closely by Malaysia and the People's Republic of China.

In addition, the larger Taiwanese companies are anchoring their global strategies with long-term (for the PC industry) OEM deals, and local assembly plants in Europe. Following is a list of companies with production sites, or with plans for production facilities, outside Taiwan.

Company	Activity
Acer Peripherals	Monitor and keyboard manufacturing in Malaysia
Acer Inc.	Manufacturing facility (motherboards?) planned for 1994 in Shanghai, PRC. Assembly facilities and European operations base in Eindhoven, Holland.
ADI	Monitor manufacturing in Thailand
Autocomputer	System assembly in Thailand
Chicony	Keyboard, motherboard and power supply manufacturing in Thailand
Chuntex	Monitor manufacturing in Thailand
Copam	System assembly in PRC
First International Computer	Building system manufacturing facilities in Shanghai, PRC
Logitech (Far East) Ltd.	Input device (Maouse?) manufacturing in PRC
Mitac International	Assembly facility in Teldford, U.K.
Taiwan Video & Monitor	Monitor manufacturing in Indonesia
Tatung	Monitor manufacturing in Thailand. Assembly facility in Teldford. U.K.

Twinhead International is notable in its decision to remain in Taiwan. Twinhead has no plans to move notebook production offshore in the next two years.

1992 PC Export



Although motherboard unit shipments are growing faster than the value shipped, the opposite is true of PCs. Taiwanese suppliers are exporting PCs of higher and higher value, even in the face of price pressures. One reason: low-end PCs are increasingly built in lower-cost countries (Malaysia, Singapore, Thailand) while Taiwanese suppliers focus on more expensive 486s.

Source: MIC, III, 1993

Profiles of Leading Taiwanese PC Hardware Companies

Acer's Recovery Relies on Blanketing Worldwide Distribution Channels

At times over the last three years, Acer, Taiwan's biggest PC company, has looked somewhat out of control while racking up losses that totaled $90 million. It has suffered through a series of patent, copyright, and intellectual property rights problems (as both defendant and plaintiff), and an ill-fated move of its headquarters out of, and then back into, downtown Taipei.

The real culprits behind Acer's decline have been a lack of focus and overdiversification. The company still builds every imaginable peripheral, as well as components, motherboards, notebooks, desktops, and deskside systems.

Over the past year Acer has rolled out an aggressive plan for recovery. Its highlights are a distribution strategy aimed at blanketing the worldwide PC market with the widest possible range of channels around the world, and a renewed new focus on engineering. In addition, the company has reorganized into 14 units that are focused on specific businesses.

Few Taiwanese companies are large enough to support a global PC brand. Acer is. With about 1% of unit PC sales worldwide, Acer has addressed the "global brand or OEM" decision with all bets hedged. The company sells Acer brand PCs through consumer electronics stores, discounters and mass merchandisers in the United States. But it also sells PCs through a variety of OEM arrangements with leading European and U.S.-based manufacturers. It sells motherboards and other components to system assemblers. In fact, over 40% of the company's revenue is derived from non-Acer brand names.

Acer has also spun off its peripheral division, which manufactures printers, monitors, and input and other devices. These are also sold through any available channel, including OEMs. Resellers include Compaq, Apple and others.

On the engineering side, Acer has designed a winning, easy-to-assemble system that will be popular with VARs, OEMs and sophisticated end users. Acer was among the first PC suppliers to offer CPU upgrades for performance-conscious users. Notebook offerings are somewhat behind the competition's; however, Acer's range of desktops and multimedia systems are impressive.

Bottom Line: Managing Global Brands Is a Full-Time Job

On the positive side, Acer's "whatever it takes" distribution strategy is winning customers. OEM business is thriving. At a time when competitors are focusing on niche opportunities, Acer appears to be expanding further. It appears to seek to provide Acer products in every stage of completion, at every imaginable channel interface.

Ominously, however, even companies much larger than Acer have a hard time being all things to all people. If Acer pumps too much cash into promoting its global brands, R&D spending may suffer. If so, it risks falling behind market performance leaders. That may jeopardize OEM contracts. Nonetheless, competition among IBM, Compaq, Dell, AST and other global names is getting hotter and hotter.

Acer's good products may suffer from overdistribution. With a confusing tangle of channels and products, Acer may be susceptible to terminal channel conflict.

Copam Electronics: An Overreliance on One Brand

Once one of Taiwan's largest PC suppliers, Copam Electronics filed for bankruptcy last month. Established in 1981, Copam rang up over $150 million in sales in 1991 before the effect of price cuts became apparent. With over 90% of sales under its own brand name (most in Europe), the company had little recourse when prices began dropping last summer. Total 1992 revenues slipped to $131 million.

A comeback will be difficult. The company has settled claims with creditors and has reorganized into two new units: one to service existing Copam users, another to build and sell components. Overseas subsidiaries will likely be sold at auction.

First International Computer: Largest Supplier of Motherboards

With ties to a major Taiwanese industrial-product company, FIC has had a solid launching pad into the worldwide motherboard business. It quickly grew to become the island's largest producer of motherboards and is now building desktop systems.

Mitac: Product Strengths Diluted by Far-Flung Distribution Network

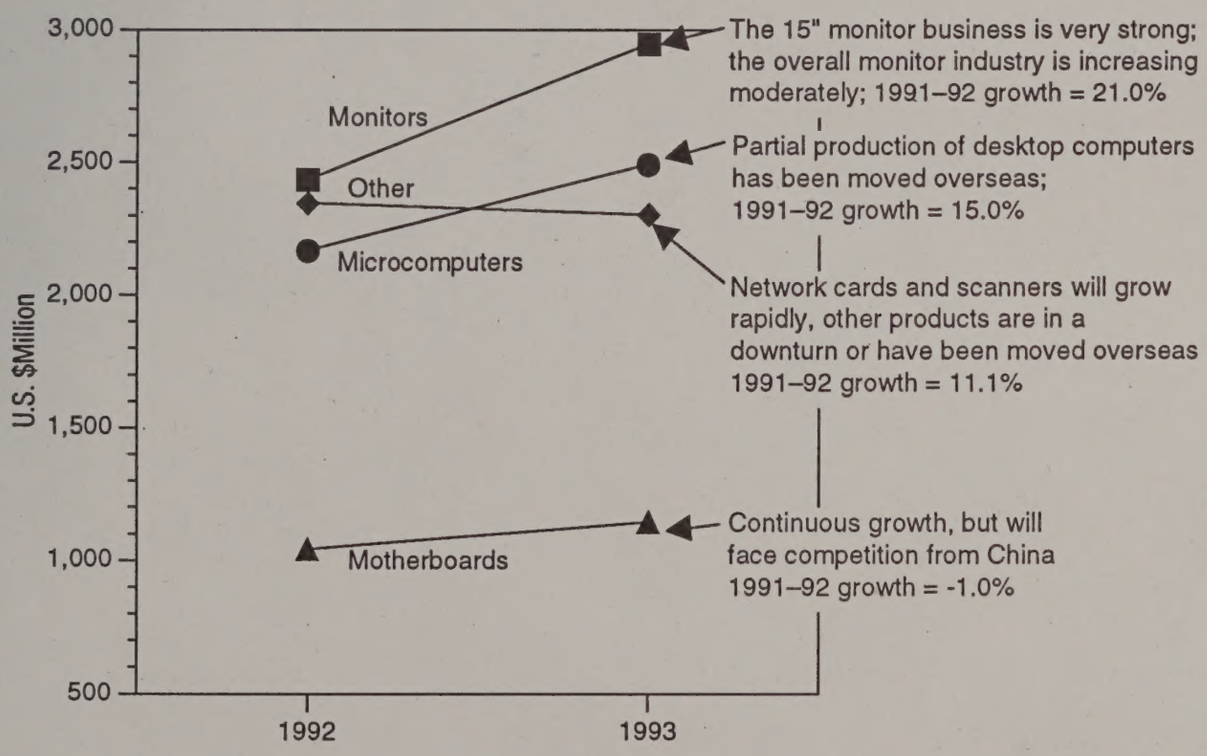
Founded in 1974, Mitac is Taiwan's second largest PC company. Revenue showed strong growth through $300 million in 1991 when falling prices drove 1992 revenue down to $250 million.

Mitac assembles and distributes a wide range of PCs, notebooks, palmtops, monitors, and modems. Though Acer has chosen to emphasize OEM sales, Mitac has not. Mitac appears to seek a stronger distribution presence than Acer, or most other Taiwanese companies. It is quietly stepping up the Mitac brand name around the world through strong sales offices in Europe (driving 40% of the company's revenue) and a wholly owned distribution subsidiary in the United States, Compac Electronics. Last year notebooks accounted for 30% of shipments.

Twinhead: Notebook Leadership

Formed in 1984 to produce ASICs and peripherals, Twinhead jumped into the systems market in 1987 and notebooks two years later. Now its second-generation notebooks are gaining recognition for design and function. Twinhead notebooks are OEMed by CompUSA and Sharp. Last year the company earned $4 million on sales of $170 million.

Taiwan's 1992 IT Industry Production and 1993 Growth Forecasts



Source: MIC, III, 1993

Information in this issue of the Gray Sheet *has been prepared with the assistance of IDC's Asian Research Center. Some of the information has been excerpted from a forthcoming IDC/ARC report,* The Taiwan Computer Industry — Review and Forecast. *For more information please contact IDC at (508) 872-8200.*

How Low-Cost, Efficient Producers Can Profit on the Way to the Future

Despite the incipient change in the personal computer industry (new chips, new operating systems, new networking, new media), the basic competitive scenario has remained static for the past five years: Intel & Microsoft, with a little AMD, Cyrix, IBM, Apple, and Novell on the side.

The stability of the structure has driven the growth of highly efficient, low-cost Taiwanese producers of PC hardware. The reason for their success is relatively simple: Taiwanese PC companies can turn a design around from blueprint to volume production faster than their competitors.

Within the constraints of the Intel and Microsoft influence, competition for information appliances still revolves around a limited handful of differentiators: retail price, features, delivery channels, and time to market.

Price is largely a function of the cost of supplies and labor. Larger companies generally have an advantage due to economies of scale no matter where they're located. Labor costs vary widely by region. Taiwanese labor is near the upper middle of the worldwide scale.

Features are a function of a company's spending on, and competencies in, applying R&D. Again, larger is probably better. Region is irrelevant since in a global economy any supplier can talk to customers and come up with creative solutions to problems.

Competing on place (presence across several distribution channels) favors larger companies that can spend lavishly on advertising and promotions. But not so much as price and features. Small companies can blanket a variety of channels, and can beat larger competitors with the right mix of promotions. Even small non-American companies.

Time to market is becoming an increasingly important differentiator. Turning a design into a product quickly and efficiently is a function of technical competence and quality processes and designs. Smaller companies have the upper hand. Smaller companies that employ loads of engineers that have access to the best process technology in the industry (such as those companies in Taiwan) have a real upper hand. It's not even close.

Taiwanese companies profiled in these pages compete on time to market. Over the past five years they have perfected the art of rapid design and creation of PC components. They have transformed it into an exact science. They now do it better than anyone on the planet.

Demand for skills like these will remain strong. As the industry evolves, however, they will need to evolve, too. Competitive advantage must be sustainable and replicable if it is to be a source of long-term profits. The key challenge for Taiwanese companies is to continue hitting on tight schedules and tight budgets over and over using newer — and inherently riskier — platforms and form factors.

Industry evolution will have two different effects on Taiwanese suppliers. First, margin pressure in older PC markets will become greater and greater. That will hurt many of these companies, and only the most efficient will survive.

Second, a new PC industry will offer long-term relief to manufacturers. Although spending on new chips, new operating systems, new networking, and new media will remain small for several more years, new products will emerge. And, more likely than not, Taiwanese suppliers will build them. The best measure of the Taiwanese PC industry fortunes will be the speed with which it can get out of old markets and shift into new ones. That will mean juggling on- and offshore production, as well as forging ties with worldwide marketing companies and organizations.

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PC Distribution Channels: Commoditization and Choices

Much current industry activity revolves around distribution channels. Last year Dell's success spawned a flurry of direct-response efforts from influential competitors Compaq, Digital, and IBM. Computer superstores reappeared in a new, low-cost profile. Every major PC supplier scrambled to get product in front of potential new customers through a dizzying array of channels.

The fluidity of the distribution dilemma is apparent in more recent events. Dell, on the heels of a large quarterly loss, is scrambling to get back to its feet. Return to profitability may be months away. Vendor-owned computer stores are making a comeback in Europe, but in the United States Tandy is still retrenching. The turmoil results from at least two conditions:

- The commoditization of the PC is complete. Multiple vendors offer similar or identical products. The products are available from a wide variety of sources. They are largely interoperable and interchangeable.
- Price wars have broadened affordability. Prices have now equalized across channels, and both corporate and small business owners are shopping an ever-widening variety of channels. The result: price competition is a less important differentiator than it has been over the past five years. It is equaled in importance by service, convenience, and other factors.

As a result of rapid price declines and commoditization, distribution channels for PCs have changed quite dramatically during the past few years.

The intensified distribution competition has generally favored larger companies. First-tier suppliers have taken market share from weaker suppliers. Apple, Compaq, and IBM have all firmly established themselves in direct response and alternative channels of distribution, including some or all of the following: mass merchants, consumer electronics retailers, catalog showrooms, and third-party mail order.

As the PC market plows deeper into the "mature product" phase of the product life cycle, distribution channels for PC products will continue to expand. Much of this expansion will involve channels already carrying PCs (office product outlets, catalog showrooms, etc.), and others (cable TV firms, telephone companies, and bookstores) will represent previously uncharted territories.

IN THIS ISSUE:

PC Distribution Channels: Commoditization and Choices 1
U.S. Distribution Mix Forecast 2
Direct Sales 2
Direct Response 2
Systems Integrators 3
Dealer Channel 3
Computer Superstores 5
VAR Channel 5
Consumer Electronics Stores 6
Mass Merchant 6
Mail Order 7
Electronic Access 7
The NOMDEX Channel 7
Toy Stores/Book Stores 7
Comparing Alternative Delivery Channels: the United States and Japan 8

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U.S. Distribution Mix Forecast

Home and corporate users are shopping a wider variety of channels than ever before. While this may be due to the proliferation of new channels, it will at least affect the flow of products through existing channels and may fundamentally alter the buying process.

As a result, IDC has revised its most recent PC distribution channel forecast. A key tool in this reanalysis is a focus on the purchasing patterns of particular customer segments. These segments include:

- Home consumers
- Small business (1–99 employees)
- Medium business (100–999 employees)
- Large business (1,000+ employees)
- Other, including government and education

Research based on the purchasing patterns of each segment revealed slight variations from previous forecasts. Most important, the traditional dealer channel remains stronger than previously expected based on several factors:

- Drastic price cuts by the first-tier vendors have leveled the playing field, allowing dealers to compete more effectively with direct response, mail order, and alternative channels.
- The economic and political environment, along with the aforementioned price cuts, contributed to a rush of corporate buying in the third and fourth quarter of 1992 — primarily from the dealer channel. Many resellers reported that they were (and remain) product constrained, reflecting continuing strength in the traditional dealer channel.
- Dealers continue to invest in services valued by corporate users, including network management services, multivendor integration, and nationwide service capability.

In addition, direct response is not growing as strongly as expected, mostly because of the increasing weakness of lower-tier, direct-response vendors. Following are profiles of each major distribution segment.

Direct Sales

The direct sales segment will continue to slide because of vendors' increasing interest in more efficient distribution — primarily via indirect channels.

Overall, this channel will not attract attention from new or existing vendors. The costs of doing business are simply too high. Vendors will, however, increasingly use direct sales organizations to call on corporate accounts creating demand, but referring fulfillment to reseller partners.

Direct Response

In 1992, price cuts by the first- and second-tier vendors pulled many price-conscious buyers into traditional channels. At the same time, this price equalization across channels drove many third-tier, direct-response vendors out of business.

The channel lost both revenue and unit share to traditional and alternate channels because of the shift in pricing and channel usage. Direct response will remain at roughly its current levels, with first- and second-tier vendors replacing the third-tier suppliers in the channel.

The major vendors, through their entry into the channel, legitimized direct response. Nonetheless, the current fascination with direct response is already on the wane. Compaq, for one, has found that mismanagement of product allocations hurt its relationships with long-term partners. In exchange for relatively small upside potential with its DirectPlus activities, Compaq put thousands of units at risk.

Just as vendors expected the collective alternate channels to provide strong incremental growth during the past several years, vendors have more recently shifted this expectation to direct response and, surprisingly, the dealer channel.

Direct response is one effective mechanism to target the

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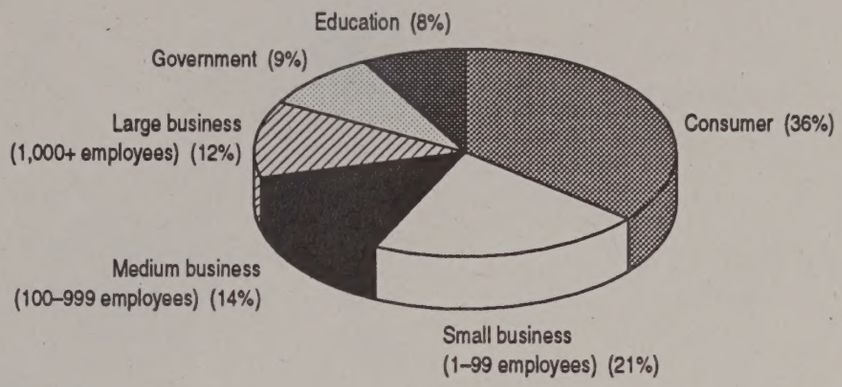
small-office, home-office (SOHO) market, but it will not become a significant channel for corporate purchasers. Other channels (computer superstores, consumer electronics retailers, etc.) offer the same benefits of direct response — price, availability, and selection — without the drawbacks.

Direct response unit shipments and shipment value will remain roughly flat through 1997. Vendors can effectively include direct response to build demand (but not necessarily fulfill demand) as part of a larger overall channel strategy.

It seems unlikely that vendors will force resellers out of the corporate business by offering preferred availability to the direct-response channel. Too many others are ready to step in and replace any such vendor trying to drive a substantial change in corporate America's purchasing tactics. Furthermore, many corporate customers do not appear to desire such change; instead they prefer to receive the market basket of products and services offered only by corporate-focused resellers such as ComputerLand, CompuCom, Ina-Com, IE's affiliates, MicroAge, and others.

PC Unit Purchases by Specific Market Segments, 1992



1992 Total: 11,442 Million Units

Source: International Data Corporation and Link Resources, 1993

Systems Integrators

Systems integrators are expected to build their shipments of personal computers slowly — from 291,000 units in 1992 to 438,000 by 1997. The growth in value of shipments, however, is expected to be much more rapid, reflecting systems integrators' participation in the larger revenue opportunities offered by RISC workstations and NT-based products.

Many systems integrators simply outsource their PC delivery to other resellers, preferring to focus on their key value add.

Dealer Channel

The percentage of overall market value derived from the dealer channel is projected to decline slightly through 1997. The percentage of total units delivered through this channel is expected to remain roughly flat through 1997, and value of shipments is expected to climb slightly.

The following developments will help to stop losses in the dealer channel from being more substantial:

U.S. PC Distribution Channels Purchased from in the Past Year (%)

	Direct Outbound	Direct Response + Mail Order	Dealer	Store	Super VAR	Mass Merchant	Consumer Electronics	Other
Consumer	–	11	36	12	–	18	15	9
SB (1–99)	19	28	45	15	13	22	6	6
MB (100–999)	29	38	48	21	24	21	5	6
LB (1,000+)	48	42	55	18	26	7	9	13

Multiple responses allowed.

Source: International Data Group and LINK Resources, 1992

U.S. PC Distribution Channel Forecast, Unit Shipments, 1992–1997 (000)

	1992	1993	1994	1995	1996	1997
Direct outbound	519	503	400	414	425	438
Direct response	1,494	1,761	1,731	1,658	1,699	1,604
SI	291	252	266	414	425	438
Dealer	5,025	5,533	5,859	5,802	5,521	5,542
Superstore	690	755	799	829	849	875
VAR	1,257	1,635	1,731	1,934	1,982	2,042
Mass merchant	999	1,006	1,199	1,243	1,416	1,604
Consumer electronics	664	604	695	760	807	831
Mail order	331	377	400	553	651	671
Other	149	101	266	276	425	729
Total	11,442	12,575	13,317	13,815	14,156	14,584

Totals may not be exact due to rounding.

Source: International Data Corporation, 1993

U.S. PC Distribution Channel Forecast, Value of Shipments, 1992–1997 ($000)

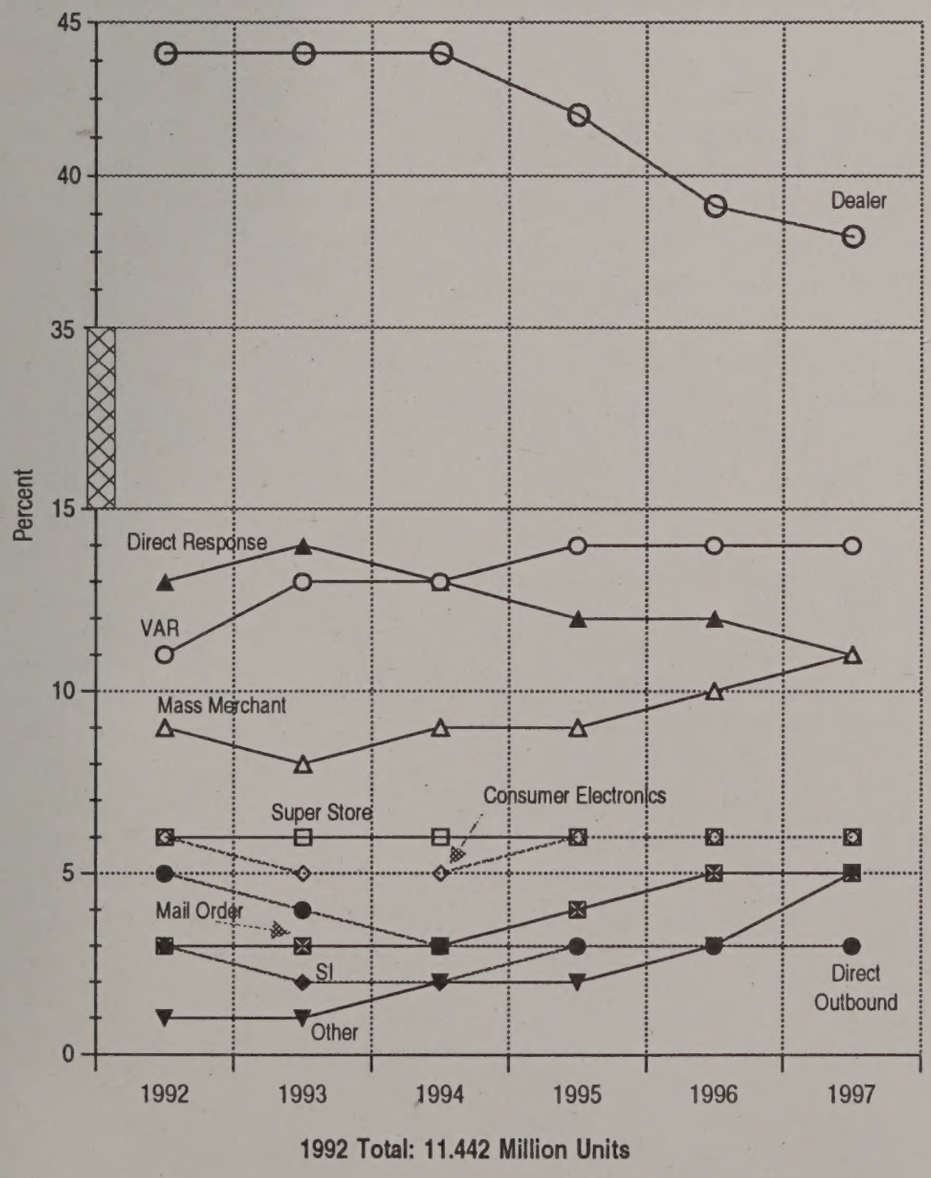
	1992	1993	1994	1995	1996	1997
Direct outbound	1,198	974	1,004	1,041	1,109	1,225
Direct response	3,182	3,165	3,012	2,862	3,049	3,062
SI	782	730	753	1,041	1,109	1,225
Dealer	10,422	10,955	10,793	10,669	10,811	11,635
Superstore	805	1,217	1,506	1,561	1,386	1,531
VAR	3,374	3,408	3,765	3,903	4,158	4,593
Mass merchant	1,563	1,704	2,008	2,082	2,495	3,062
Consumer electronics	1,207	1,169	1,305	1,431	1,580	1,745
Mail order	721	730	753	1,041	1,275	1,408
Other	145	195	502	520	832	1,225
Total	$23,399	$24,345	$25,101	$26,022	$27,720	$30,618

Totals may not be exact due to rounding.

Source: International Data Corporation, 1993

- The dealer channel is currently undergoing a shift in business model; it is slowly moving from a focus on product fulfillment to focusing on service offerings. Dealers continue to build their capabilities in two areas.
- The few aggregators that are left have built efficient, centralized distribution centers. They are generating an increasing amount of their sales through efficient sales strategies such as telesales and national account management.
- Services, on the other hand, will be delivered at the local level.
- The dealer channel will embrace Windows NT and become the primary vehicle to deliver NT-based solutions.
- The dealer channel delivers and installs a substantial percentage of all networking products for corporate America.

U.S. PC Distribution Channel Forecast, Unit Shipments, 1992–1997 (000)



1992 Total: 11.442 Million Units

Source: International Data Corporation and LINK Resources, 1993

Computer Superstores

Computer superstores have shown continued strength and aggressiveness in opening new locations. CompUSA is approaching 50 outlets, and ComputerCity has some 10 outlets currently.

However, computer superstores tend to polarize potential shoppers around one of two extremes:

- Shoppers view computer superstores as a convenient place to shop for a variety of computer-related goods. Many find it a "shopping extravaganza."
- Others find the large retail format and thousands of options daunting. These shoppers choose to frequent other retailers that have already slimmed the product selection for the user.

Computer superstores will compete for customers with other traditional retail formats; these include consumer electronics retailers, mass merchants, office product outlets, catalog showrooms, and others.

VAR Channel

VARs continue to represent an important channel for vendors looking to add value to their products and to target specific customer sets or vertical markets. Because of the rapidly shrinking delta between first- and second-tier vendors' prices, some fundamental changes are occurring in the VAR channel:

- Historically, the average system value in the VAR channel has

Disentangling the Channels Maze

Channel Category	*Type of selling activity/Examples*
Direct outbound	Direct sales force — IBM, e.g.
Direct response	Dell, Gateway
SI	EDS, SHL Systemshouse
Dealer	ComputerLand, MicroAge
Super store	Computer City, CompUSA
VAR	Reynolds & Reynolds, ASK
Mass merchant	Lechmere, Sears
Consumer electronics	Circuit City, Fretter
Mail order	PCs Compleat
Other	AAFES

been quite low, reflecting VARs unwillingness to pay premiums for first-tier vendors' products.

- As prices have dropped and the first-tier vendors' products have become available through two-tier distribution, IDC expects many VARs to substitute premium products for "no-name" clones.

As a result, the VAR channel will increasingly sell first-tier products and receive accordingly better technical, marketing, and sales support. This in turn allows the channel to continue to target larger opportunities and present a more professional, polished face to its customers. (Historically, many VARs have shown all the warts of the typical small business — stretched too thin, no financial stability, lack of management and business acumen.)

Consumer Electronics Stores

The value of shipments through consumer electronics stores will grow 50% from 1992 to 1997. Unit shipments will grow less quickly, reflecting the partial equalization of prices and system values across channels.

Some of the major factors behind the growth of this channel include the following:

- As U.S. PC market growth slows, vendors are looking to this channel and the related mass merchant channel as a way to reach consumers, home office/home workers, and small businesses. As a result, a greater number of brands and products are becoming available through a broadening variety of traditional electronics outlets.
- The commodity nature of the notebook and laptop markets, as well as the low and midrange of the desktop PC market, makes the consumer electronics and mass-merchant channels a natural outlet for products during the forecast period. An increasingly sophisticated PC buying public is purchasing on price and is less concerned with hand-holding amenities.

The following factors, however, may counteract growth:

- The emergence of computer superstores offers a greater selection of computer products than in the consumer electronics or mass merchant channels.
- Oversupply. Despite growth in these channels, the dominant vendor — Packard Bell — has benefited most from the boom. Barriers to entry, such as the high-volume, price-driven dynamics of the consumer electronics channel, precludes market newcomers from attaining significant market presence for prolonged periods.

Nonetheless, first-tier vendors such as IBM, Apple, and Compaq, among others, have all stepped up their activities in these retail-oriented channels.

Mass Merchant

As with consumer electronics stores, the value of shipments through mass merchant channels is expected to grow strongly in the 1992–1997 time frame.

Through most of 1992, weakness in the American economy has constrained purchases of home users. Although small business may be able to justify a capital outlay, even in a recession, casual purchasers have no such justification and will delay or forego such expenditures. Their money may be put into savings or spent on necessities.

Since November 1992, the changed political and economic climate has bolstered consumer spending and fueled some growth in this sector.

As a result, the home sector will continue to play a limited role in

PC sales for both consumer electronics stores and mass merchants. Given the demographics of these two related channels, mass merchants will suffer more from any ongoing weakness in the U.S. economy.

On the other hand, IDC expects vendors offering personal digital assistants (PDAs) and other subnotebook devices to employ the retail channels as their primary access to the market. Although these products are not included in IDC's PC forecast, they will pull buyers toward new brands and technologies and offer a basis for a step up to PCs.

Mail Order

Few significant opportunities exist for vendors to tap into mail order. A limited number of reputable mail-order firms exist for vendors to target. Similarly, only a subset of the user population is predisposed to buying products over the phone. In addition, extensive price-based competition from computer superstores and alternate channels will constrain growth. As a result, the forecast for mail order is roughly flat for the forecast period.

Electronic Access

Computers, along with a variety of other computer- and noncomputer-related products, will become available through electronic stores such as those offered by Prodigy, two-way cable, and others.

For instance, Hewlett-Packard is planning to provide an under-$700 "information-appliance" for use with cable television systems.

The NOMDEX Channel

NOMDA retailers, selling copiers and fax machines, have long focused on customer services and repeat business. Over time, however, many of these retailers are finding that computers are a necessary part of their product offerings.

IDC expects that some percentage of the NOMDA population will make the migration to computer literacy and become a hybrid — not NOMDA, not COMDEX, but NOMDEX.

Toy Stores/Book Stores

As vendors continue to design and build PCs that more closely approximate the functions and pricing of other consumer goods, PCs will continue to infiltrate new channels. Specifically, IDC expects low-end PC devices — particularly hand-held notebooks and subnotebooks — to begin surfacing in new channels. At first, these may be application-specific devices

As students and others increasingly use low-end products for reference or online access, IDC expects to find PCs in traditional media retailers — bookstores. Similarly, as costs continue to decline, PCs should begin showing up in toy stores.

Information in this issue has been excerpted from IDC's Channel Navigator newsletter edited by Lee Levitt. For more information, please contact him at (508) 935-4230.

Average System Price by Channel, 1992–1997 ($000)

	Direct Outbound	Direct Response	SI	Dealer	Super Store	VAR	Mass Merchant	Consumer Electronics	Mail Order	Other	Total
1992	2.3	2.1	2.7	2.1	2.1	2.7	1.6	1.8	2.2	1.0	2.0
1993	1.9	1.8	2.9	2.0	2.0	2.1	1.7	1.9	1.9	1.9	1.9
1994	2.5	1.7	2.8	1.8	1.8	2.2	1.7	1.9	1.9	1.9	1.9
1995	2.5	1.7	2.5	1.8	1.8	2.0	1.7	1.9	1.9	1.9	1.9
1996	2.6	1.8	2.6	2.0	2.0	2.1	1.8	2.0	2.0	2.0	2.0
1997	2.8	1.9	2.8	2.2	2.1	2.2	1.9	2.1	2.1	1.7	2.1

Source: International Data Corporation, 1993

Comparing Alternative Delivery Channels: the United States and Japan

One measure of the strength and speed of the movement away from the dealer channel and towards alternative channels is the degree to which similar shifts are occurring in other countries. Distribution systems in Japan, the next largest IT market after the United States, are also changing, but more slowly than in the United States.

Direct marketers are just beginning to make inroads in Japan. Dell and IBM Japan are two of the more notable U.S.-based suppliers to inaugurate direct channels in 1993. Such moves represent enough good news to indicate that direct marketing, and direct marketing in Japan, may be catching on.

In fact, Dell in Japan has indicated that demand is running far ahead of expectations. IDC Japan predicts that Dell will sell 22,000 PCs in Japan in 1993, and 45,000 in 1994. Dell officials feel that as soon as the Dell name becomes familiar to Japanese buyers, any psychological barriers will quickly diminish, further driving sales. IBM has begun selling a limited number of notebooks directly. In addition, some retailers in Tokyo's Akhibara electronics-store district are starting to sell directly. So far, buyers have been mostly consumers, with business buyers moving more slowly into the channel.

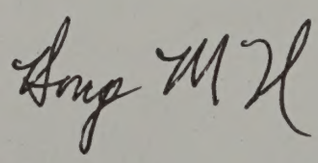
These developments are interesting, but they are far from a groundswell. Direct marketing in Japan still has a long way to go for two primary reasons: the buyers need for extraordinary hand holding and support, and their very strong identification with national brands.

The vast majority of Japanese computer buyers are highly dependent on dealer hand holding. The typical support goes well beyond what U.S. PC consumers would expect from their dealers. As a result, price, performance, and product quality are not the principal considerations for most Japanese buyers, who want the security that they believe they can get only from domestic suppliers. That a computer is offered inexpensively through direct channels has little or no bearing on a decision.

Japanese companies, especially small- and medium-sized companies, have a very strong preference to purchase national brands. National suppliers (such as NEC, Fujitsu, Epson, and Toshiba) have little interest in selling directly. Such a move would harm the time-honored and well-cultivated relationships with distributors and dealers.

How might direct marketing catch on in Japan? There are two scenarios by which alternative channels may have a greater impact on the Japanese market. Either the emergence of a low-cost, direct-marketing Japanese startup that can address these uniquely Japanese concerns better than Dell, or the rapid growth of Dell/Akihabara direct-sales momentum might entice traditional Japanese dealers to launch direct sales efforts. But the barriers to these changes are rooted in age-old business practices. It seems unlikely that anything will change quickly.

Buying patterns in the United States are more susceptible to change, but not as susceptible as some might think. IDC's forecast for the dealer channel shows slippage of only 10 percentage points over the next five years. American buyers, like their Japanese counterparts apparently, may not be willing to risk PC purchases on unproven new channels without a little more evidence that those channels can support them.



THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | July 30, 1993 | VOL. 28, NO. 18 | Published continuously since 1964.

The New Europe: Opportunities and Obstacles for IT

IN THIS ISSUE:

The New Europe: Opportunities and Obstacles for IT 1
National Differences 2
Europe in the IT World, 1992 2
Western Europe IT Spending by Market, 1992 and 1997 2
Western Europe 1992: IT Spending by Country 3
First Look at 1993: Some Recovery 3
U.S. Vendors' 1992 European Revenue: Hardware 4
U.S. Vendors' 1992 European Revenue: Packaged Software 4
Supply Side: The Vendor View 5
Profiles of Leading European Suppliers ... 6
Bull 6
Bull Revenue and Net Income, 1985–1992 6
ICL 6
Olivetti 6
SNI 7
ICL Revenue and Net Income, 1985–1992 7
Olivetti Revenue and Net Income, 1985–1992 7
Western European IT Market Leaders in 1997 8

The $128 billion Western Europeans spend on information technology (IT) remains the global industry's most diverse market, even as the European Community (EC) moves grudgingly toward consensus. On the outside it looks surprisingly like the IT market in the United States:

- The European market, like the U.S. market, comprises about 35% of the worldwide IT market.
- U.S. and European markets have been growing at a similar rate over the past several years. Measured in local currencies, the United States outgrew Europe by a small margin.
- The proportions of different market segments — from PCs to software — are very similar between the U.S. and Europe. Software and services account for over 50% of the market, PCs account for approximately one-quarter.

In this case, however, looks are deceiving, from both the end-user and the IT-supplier perspective. From the end-user perspective, the European smorgasbord of languages and IT cultures is very different in character from the monolithic U.S. market.

Today Germany represents about a quarter of the total European market, followed fairly closely by France, the United Kingdom, and Italy. Together these four represent over two-thirds of the Western Europe market. The other 30% is divided among a number of countries with market shares under 10%. Such fragmentation highlights just how much Western Europe differs from the United States.

On the supply side, European IT companies are evolving out of building technology and into providing solutions and services, while American companies exercise the technical muscle. In addition, U.S.-based suppliers of IT are far more globalized, and far more European, than the major European suppliers — Bull, ICL, Olivetti, and SNI. The U.S.-based suppliers draw, in general, revenues from a broader mix of countries and regions and rely less on a single European country as an anchor to their revenue streams.

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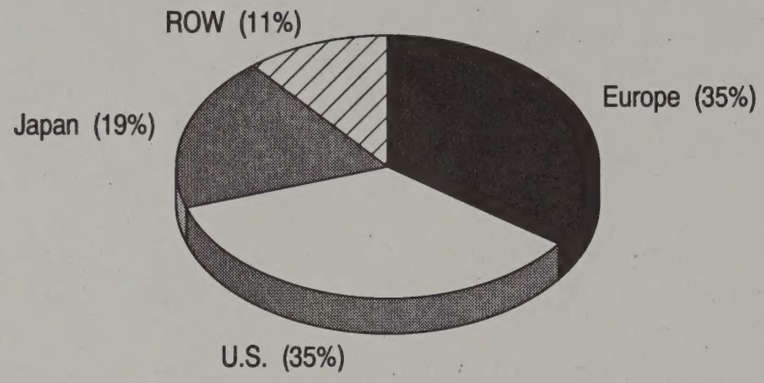
Europe in the IT World, 1992



Total 1992 Worldwide IT Market: $360 billion

Source: International Data Corporation, 1993

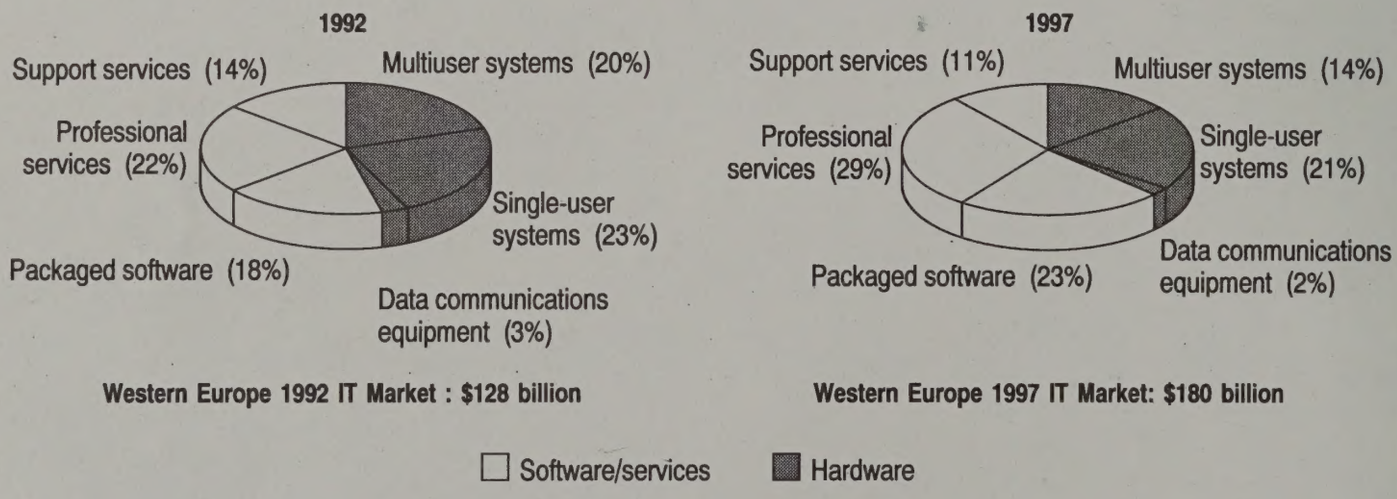
National Differences

IDC's research has found crucial and enduring differences in the attitudes of IT users in the countries of Europe.

German users tend to be highly experimental. They rarely view a new technology or product with anything but enthusiasm. They tend to be independent. When they don't use systems integration services it is because they do not want to give up control to outsiders.

French users tend to exist in more centralized environments. They tend to be more willing to use outside suppliers, particularly in contrast to German users. And, French users also tend to be early

Western Europe IT Spending by Market, 1992 and 1997



Western Europe 1992 IT Market : $128 billion

Western Europe 1997 IT Market: $180 billion

Source: International Data Corporation, 1993

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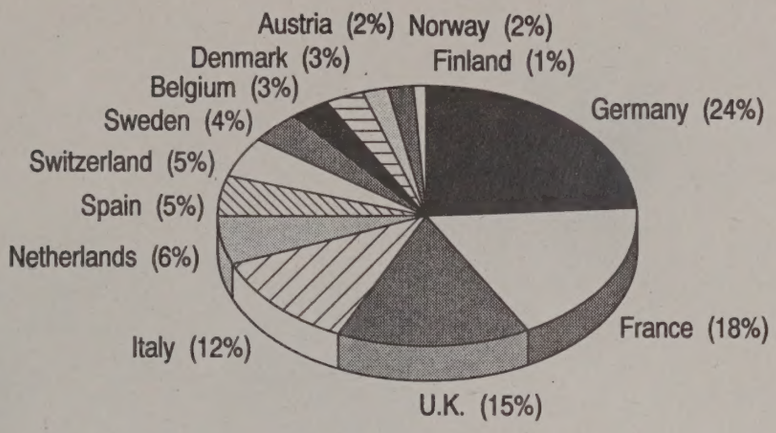
Western Europe 1992: IT Spending by Country



Western Europe IT Market: $128 billion

Source: International Data Corporation, 1993

adopters, though less vigorous and enthusiastic than German users.

In the United Kingdom there has been a very cost-conscious attitude over the past several years, as well as a fairly conservative attitude toward implementing new technologies and products. After the new technologies are fairly well established, the attitudes and strategic directions of U.K. users are very similar to those of users in the United States.

The role of small businesses in Italy makes that country seem almost reactionary, in some ways. For example, in 1992 "X286" PCs were still a bustling business in Italy, although less so in the latter half of the year. Many small businesses decided that 286 PCs were perfectly adequate, even in light of two (now three) newer product cycles.

The opposite is true in Scandinavia. There, users pride themselves on using the latest technology. In Scandinavia "X386" PCs peaked a couple of years ago, and everyone now wants a 486.

Spain offers yet another IT environment. It is almost an emerging economy: in comparison to other European countries it has had a much more vigorous emerging-economy growth, at least until the past 18 months. The absence of history means that during the 1960s and '70s, when local European vendors were developing in other national markets, the same was not happening in Spain. In addition, major U.S. and European vendors did not lock-in key IT sectors. As a result, only one of the top ten IT vendors in Spain is Spanish. And the number two supplier is Fujitsu.

Growth across European countries also varied widely. The German IT market grew fastest (5.0% in 1992, down from 6.9% in 1991), while the U.K. market made a solid rebound (4.0% in 1992, up from 0.8% in 1991). Italy mirrored overall growth (2.1% in 1992, down from 5.0% in 1991), while France (1.0% in 1992, down from 2.1% in 1991) grew most slowly among the major European countries. Overall, EFTA countries will gain some of the growth lost in prior years (1.4% in 1993, followed by 5.3% in 1994).

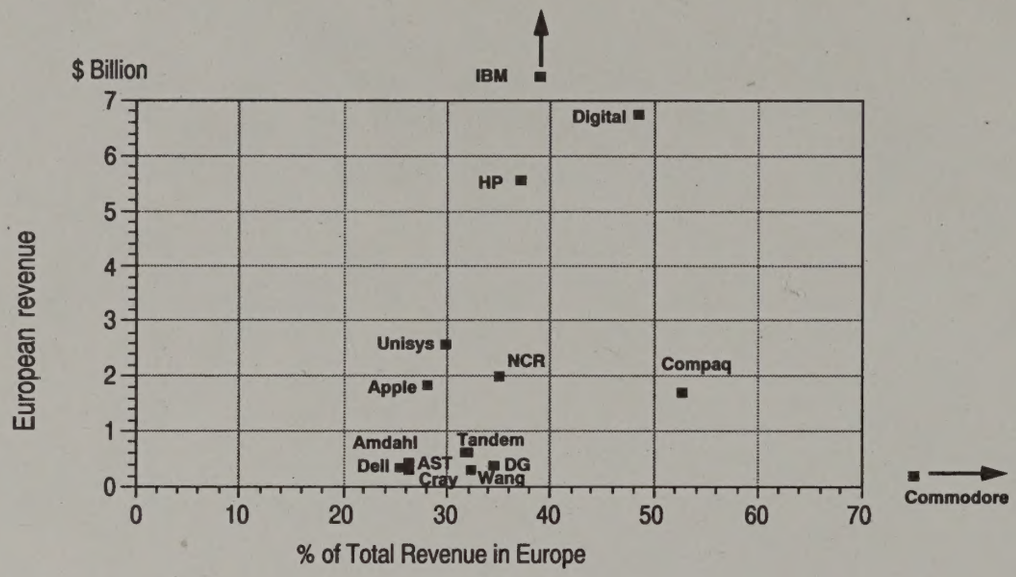
First Look at 1993: Some Recovery

Through the end of 1992 and the first half of 1993 the European IT market results were affected by the following factors:

- a worsening economic picture
- the shifting role of Germany from a "driver of" growth to a "drag on" growth
- the squeezing of growth from the systems market
- strong demand for PCs, coupled with plummeting PC prices
- increasing price competition in software and services.

Europe's overall IT growth in 1992 was 2.8% in local currency. Despite the hostile economic environment, the IT market is expected to stage a modest recovery in 1993 as Europe slowly moves out of recession. The 1993 growth rate will total approximately 4.0%. A stronger recovery is expected

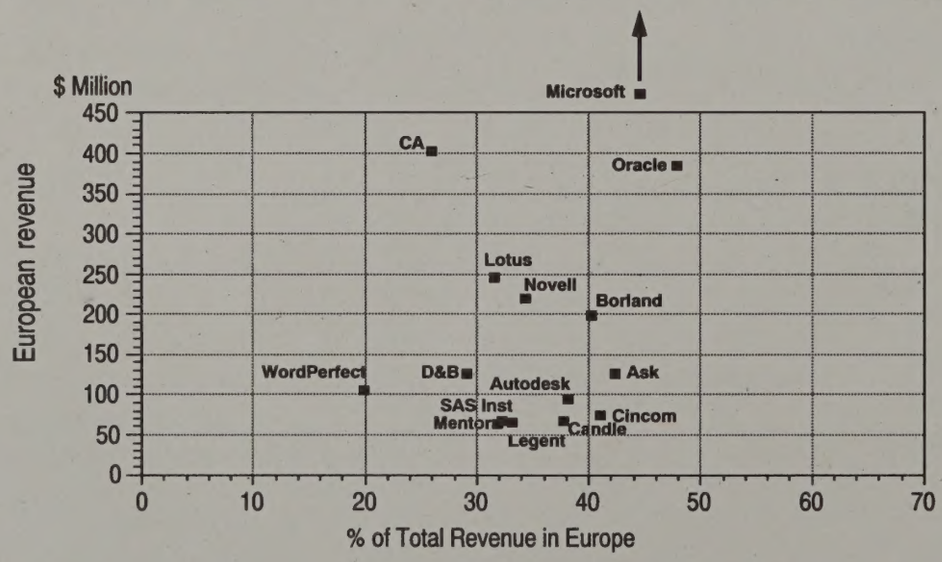
U.S. Vendors' 1992 European Revenue: Hardware



Source: International Data Corporation, 1993

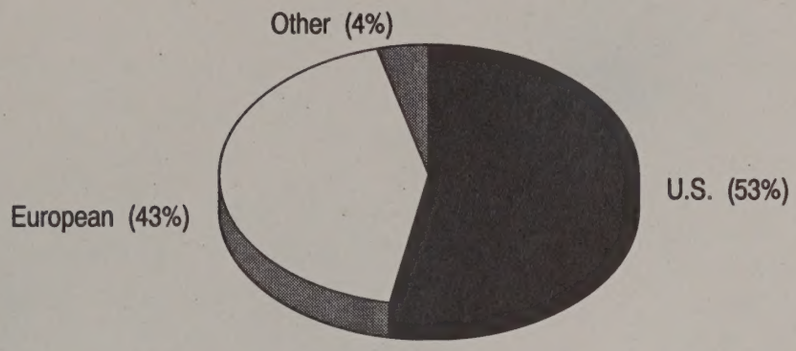
Graphed here are the European revenues of major U.S.-based hardware and software companies. European revenue is plotted along the vertical axis, and proportion of overall revenue derived in Europe along the horizontal. In both hardware and software cases U.S. companies are clustered around 35%. This is particularly notable, because Europe represents approximately 35% of the entire IT universe. Software, while clustered around 35% is not as transnational as the hardware business. The U.S. tends to be a much higher proportion of the software companies' revenue stream than for hardware. And, because of the immature software markets of the Pacific rim and elsewhere in the world, Europe represents a much higher proportion of non-U.S. business to software vendors.

U.S. Vendors' 1992 European Revenue: Packaged Software



Source: International Data Corporation, 1993

Western Europe 1992: Vendors



Western Europe 1992 IT Market: $128 billion

Source: International Data Corporation, 1993

in 1994, when the overall IT market will grow by 6.5%.

Growth opportunities are increasingly found in software and services markets, and not in more traditional hardware markets. Among the highlights of the 1992 and first-half 1993 results in local currencies:

- Hardware revenue in Europe shrank by 3.4% in 1992, while the outlook for 1993 is flat. Growth is coming from the low end of the hardware market. Growth in single-user systems segments will be offset by further reductions in the value of multiuser systems shipped.
- Software revenues increased by 9% increase in 1992, a trend that will likely be repeated in 1993.
- Strong services growth continued, but varied widely among different segments. Network services set the pace by growing by 14% in 1992 and are expected to grow by 15.7% in 1993. Professional services couldn't quite keep up, growing by "only" 8.2% in 1992, with the outlook similar for 1993. Support services are characterized by lower growth (4.1% in 1992, and less in 1993). Processing services, as well, grew even less quickly, 4% in 1992 and through 1993.

Supply Side: The Vendor View

U.S.-based vendors in Europe account for slightly over half of the entire IT market. This is from the perspective of the company selling the hardware, software, or service. If the viewpoint were based on the manufacturer of the product, "other manufacturers" would just about double, and another 1% would slide to the U.S. portion, while European companies would go under 40%.

Looking at sales in Europe by U.S. hardware vendors, a clustering exists at about 35% of sales. This 35% is significant because Europe represents about 35% of the IT universe. One measure of the health of a global business is the degree to which its sales mirror the regional distribution of markets for that business area.

U.S.-based software companies also cluster around 35% sales in Europe. But that does not mean the market is as transnational as the hardware market; it isn't. A much higher proportion of U.S. software companies' revenues is derived domestically. The biggest difference is that immature software markets in the Pacific Rim and elsewhere in the world drive the European proportion of U.S. vendors' software revenue higher.

Profiles of Leading European Suppliers

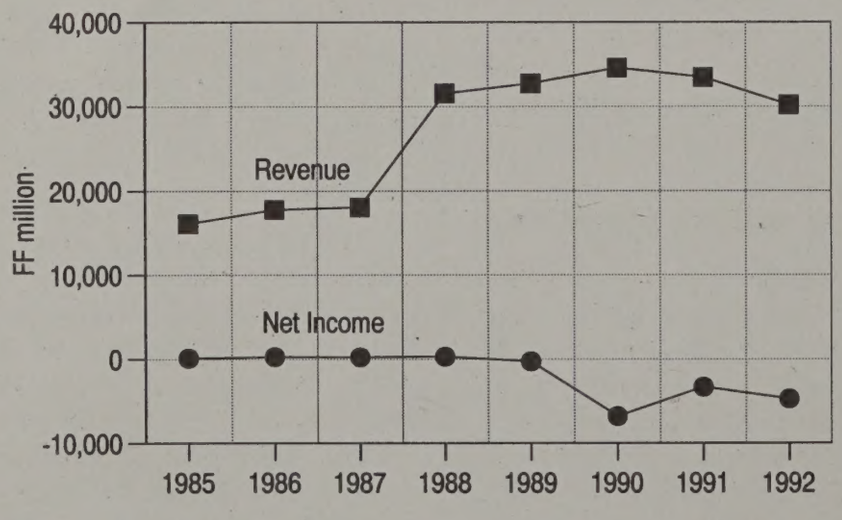
Bull

Bull is a company that has changed less over the past 10 years than almost any other major supplier of IT — European, Japanese, or American. This is not necessarily good news. In 1992 Bull lost $900 million, including half real losses and half from plant closings. To help pay for these the French government got permission from the EC to pump another billion dollars into the company to pay for layoffs and shut downs.

Bull's short-term objective — a quick return to profitability — may not be possible until it addresses broader issues: can the company really change its long-term strategy, culture, and tactics? Bull seems to feel that it can leverage the fact that it remains a mostly-European company, rather than Japanese-owned. It is betting on the intangible advantages of being a truly European company in the market. However, these attempts appear at odds with the broader services-or-technology questions that continue to produce losses.

Further, Bull's NEC mainframe business is the company's strongest pan-European product line. Its lower-end multiuser systems business is stronger in France. On the positive side, Bull's commitment to POWER RISC is a plus. Its Distributed Computing Model is an ambitious attempt at coordinating the integration of multiple systems and architectures, a greater necessity and challenge for Bull than its customers.

Bull Revenue and Net Income, 1985–1992



Source: International Data Corporation, 1993

ICL

ICL is the bright spot in the otherwise dismal performance of European suppliers in 1992. ICL's recent performance shows how well a company can profit from affiliation with Japanese technology and capital. Not only did revenue grow by 10%, largely due to the acquisitions of Nokia and Technology PLC, but ICL was actually profitable.

On the hardware side, ICL saw 1992 revenues grow by 11%, primarily due to strong U.K. business. Large-scale revenues dropped by 5% but were offset by growth in medium-scale (10%) and small-scale (15%). Equally important as Fujitsu's capital and technology has been the push into software and services.

Olivetti

On the surface, Olivetti seems to be in a similar position as Bull: decreasing revenue and mounting losses. But Olivetti has a more flexible approach to the market that may hasten a turnaround.

In 1992 Olivetti reorganized into three groups: Products (office products and PCs), Systems (multiuser systems), and Services

(including Oliservice, the software division, and Olivetti Information Systems).

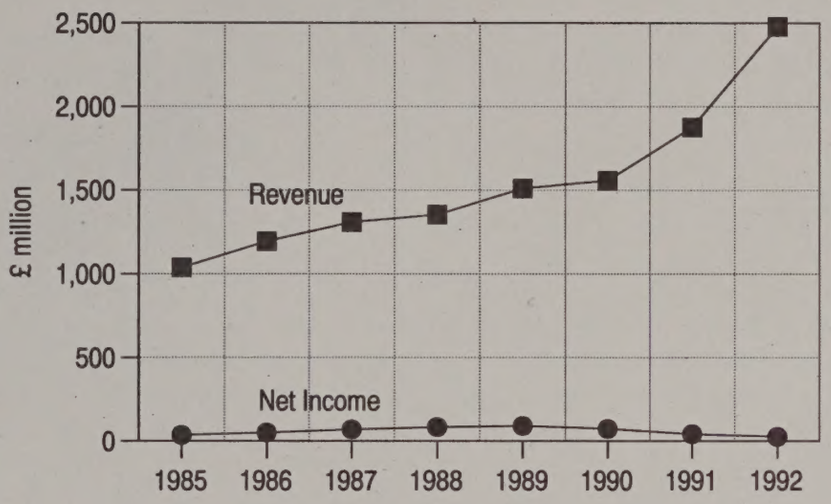
Also in 1992, Digital bought 4.0% of Olivetti stock and has agreed to buy another 4.0% by the end of 1994. This year Digital will buy another 1.9%. Olivetti's relationship with Digital is an important part of its overall strategy. It gains Alpha chips, system platforms, networking software, and financial stability. In addition, Olivetti makes Digital PCs in Europe. On the high end, Olivetti is the local (Italian) supplier of Hitachi plug-compatibles.

SNI

After three years, the hopes and expectations that were created by the merger of the two largest local computer suppliers in the most dynamic market in Europe appear to have gone unfilled. The sharp cultural differences between Siemens and Nixdorf have proven to be as difficult to bridge as integrating several product lines into a single unified product strategy.

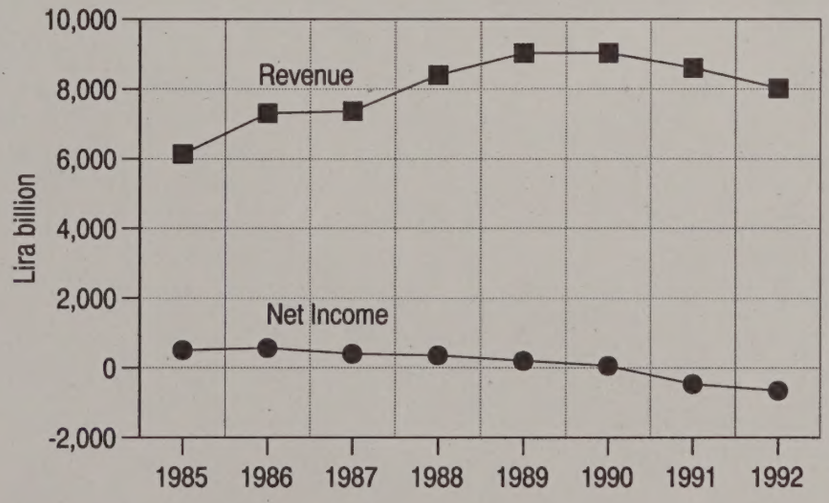
In 1992, SNI lost several hundred million dollars even as revenue grew by about 7%, driven by software and services. SNI's Western European revenues declined by 9% and 10% in large- and medium-scale systems. Small-scale systems did provide some growth.

ICL Revenue and Net Income, 1985–1992



Source: International Data Corporation, 1993

Olivetti Revenue and Net Income, 1985–1992



Source: International Data Corporation, 1993

Western European IT Market Leaders in 1997

Changes overtaking the European IT market are poised to disrupt the balance of power among IT suppliers. It is a balance based on 30 years of customs, culture, and history.

Spending in Europe for software and services continues to grow far faster than for traditional hardware systems. The overall IT market will see annual growth of between 7 and 8% over the next five years in Europe. Hardware sales will be flat or slightly lower, and software and services will expand by 12 to 15%. In short, the overall IT market will experience healthy growth but will create a totally new market. By 1997 software and services will account for almost 65% of the total IT market.

That's not the only change European markets will see. Competition will become more intense as U.S. promulgated standards become more ubiquitous. It follows that companies with different sets of competencies will prosper in the new competitive scenario.

What is less clear is the degree to which the new scenario will favor international IT suppliers of different nationalities. Will American, European, Japanese, or some combination of international companies prosper in the new IT market in Europe?

The basic forces driving the change have no national bias. Inexpensive microprocessors, emerging networking standards, commercial RISC systems, and plummeting mainframe prices appear, on the outside, to favor no single country or region.

European suppliers appear most likely to benefit from the growth. Unfortunately, they also remain anchored to past practices. Bull's business is largely French, Olivetti's Italian, and so forth. Tapping the cross-European market may be difficult for them.

American companies have much software and services expertise. Integrators such as Andersen, CSC and EDS bring the necessary skill sets to address the new market. In addition, American companies are spread across Europe more evenly than their European competitors.

To date, however, American involvement in Europe has been largely confined to hardware. Tapping the new markets for software and services will represent a new and different type of challenge for American vendors.

Japanese IT suppliers have approached the European market primarily through investments in local companies. The only significant exception is Fujitsu's presence in Spain.

If today's IT market leaders want to retain share, they will need new products and plans. As more of the European market develops, a truly European perspective will help IT suppliers. At this point the only true Europeans are Americans.

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Software Creation and Publishing: The Offshore Development Alternative

IN THIS ISSUE:

Software Creation and Publishing: The Offshore Software Development Alternative 1
Software Publishers: Divergent Scale Economies Drive New Industry Model 2
All in the Family: A Global Village of Programmers 2
Diverging Software Economics — Production vs. Marketing/Distribution 3
Users and IS: The Offshore Decision 3
Worldwide Contract Programming Services, 1992 4
Strategies for Leveraging Expertise: Governments' Role 4
Case Study: India 5
Nurturing a Niche 5
The Key Players 5
Major International IT Companies with Offshore Software Development Projects 6
User Ratings of Criteria for Doing Business with Indian Firms 6
End-User Requirements for Offshore Developers 6
Key Issues in Going Offshore 7
Offshore Software Suppliers: Brand Names Are Next 8
IT Design and Manufacturing: The Offshore Migration 8

Large end-user IS development organizations and software publishers have very different requirements, systems, and practices for the development of software. Yet both are interested in similar goals: cost reductions without sacrificing quality programming. Those goals are driving interest in software development alternatives that capitalize on the large and experienced labor pools and relatively low wages of many developing countries.

Software publishers are in the midst of sweeping changes in the structure of the industry. The evolution of the software publishing model continues to accelerate, driven by the wide difference between the development cost of software and its marginal selling and distribution cost. The gap is driving the evolution of a new software publishing model.

Users, on the other hand, are feeling a different set of pressures. Business processes are being redesigned; that means new, more complex, systems and more applications. Top-notch programmers with business understanding are at a premium. And, as always, budget pressures are intense.

Like the hardware side of the industry, one source of cost advantage lies in the offshore labor pool. In the 1980s offshore sourcing was limited to basic hardware components. Offshore suppliers are now offering a much broader range of goods and services, including software development (see page 8). They are aided — indeed driven — by government policies that explicitly seek to promote services-based economies that are often led by software development.

The availability of software engineers in developing countries at a fraction of the cost of engineers in the industry's traditional strongholds may drive a new phase of industry growth. It also may loom as a significant threat to some types of software development organizations in the United States, Europe, Japan, and other developed countries. In this issue of the *Gray Sheet* we examine the dynamics and benefits of offshore software development for publishers and users.

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Software Publishers: Divergent Scale Economies Drive New Industry Model

Today's software industry actually masks two divergent sets of economics (see chart, page 3, and the *Gray Sheet* 28:2, December 11, 1992). Software marketing and sales have significant scale economies. Software development and distribution are characterized by scale diseconomies.

The net result is a gap between production cost and sales cost. It is a gap that is driving a new industry model more akin to traditional publishing.

At issue is the separation of the two distinct components of selling software, creation, and distribution. Software suppliers are evolving a development strategy not unlike that of major book publishers and film producers: find the best talent and buy their titles.

Distribution of software assets through established company-owned or -influenced channels is where size means economies of scale. Small developers and programmers might not otherwise be able to afford wide-scale distribution and marketing. So both parties win.

The separation of creation from distribution assures that software companies get access to "artists'" best works. They pay for results, and little else.

All in the Family: A Global Village of Programmers

Sending software development jobs overseas is just one way of tapping lower-cost labor. Many U.S.-based software companies are hiring foreign nationals to work in the United States. Often a loosely knit and informal network of foreign nationals is the primary influencer of a company's use of offshore resources. Increasingly, the relationships are becoming more complex as well as less structured.

As several major companies, including Sun, have found, it matters little where the programmers sit. Sun's well-publicized collaboration with the Moscow State University is an example of offshore development that appears to be proceeding successfully.

Other companies, such as Parametric Technologies, employ foreign nationals in the United States with success. Parametric employs several dozen Russian nationals, many with advanced degrees. Their U.S. wages are huge, compared to what they might be able to earn in Russia, but far lower than the going rate for U.S.-trained equivalents.

Those wages are inflated in two ways: a high management overhead and language difficulties. Parametric management needs to devote more resources to ensure that the Russian scientists are on track and on schedule. In addition, some of the programmers' expertise is diluted by language difficulties that may take months, or years, to solve.

On the whole, the Sun and Parametric examples point out that U.S. companies are more willing to create new partnerships with offshore talent. These kinds of arrangements are the more replacing inflexible structures of the past. Large body shops (firms that hire out experienced, low-cost programmers) and software factories (collections of developers that focus on a single large job) in developing countries are giving way to more successful (and, not coincidentally, smaller and more focused) operations.

The abundance of skilled engineers in Taiwan, for example, has given rise to several successful small software companies. Software engineers in Taiwan cost from 50–65% less than their U.S.-based equivalents. India's programmers come at an hourly rate of $15 to $25 compared with $35 to $50 in Ireland, and far higher in the United States.

Of perhaps even greater interest, however, are cost savings in

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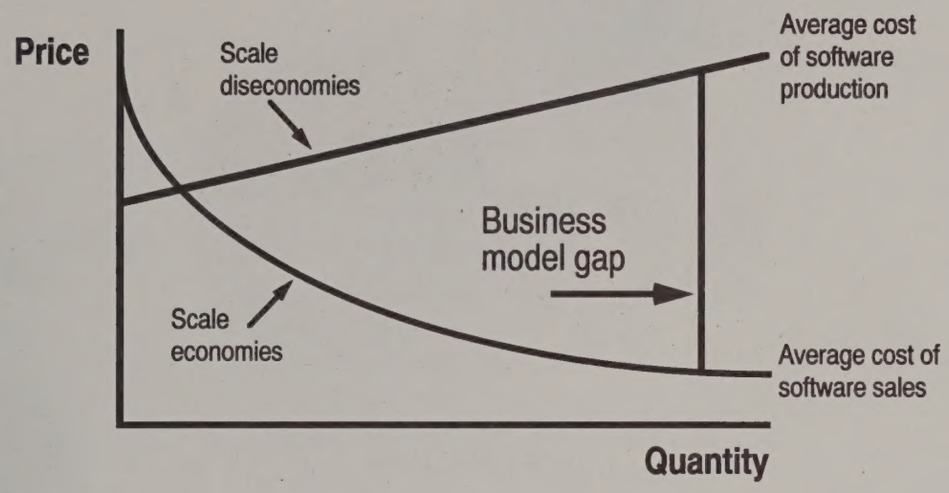
Diverging Software Economics — Production vs. Marketing/Distribution



The gap between software development costs and software sales costs creates several unique problems for software publishers. Developers who create software carry a high overhead of fixed expenses. The low cost of sales creates an artificially low price floor. The net result is business model dysfunction and potential problems. One way of bridging the gap is by leveraging the inexpensive expertise of offshore programmers to reduce development expenses.

Source: International Data Corporation, 1993

other countries. Several Taiwanese firms are contracting with mainland Chinese companies. Chinese Ph.D.s cost as little as 1/15 the price of their U.S. counterparts.

Not all projects, however, see cost savings in offshore solutions. Sometimes programmers from India are brought to this country to work at the client's site. In these cases, a good portion of the savings can be lost in travel charges. In other cases, where the work is done in India, large costs can accrue in telecommunication charges and travel to India.

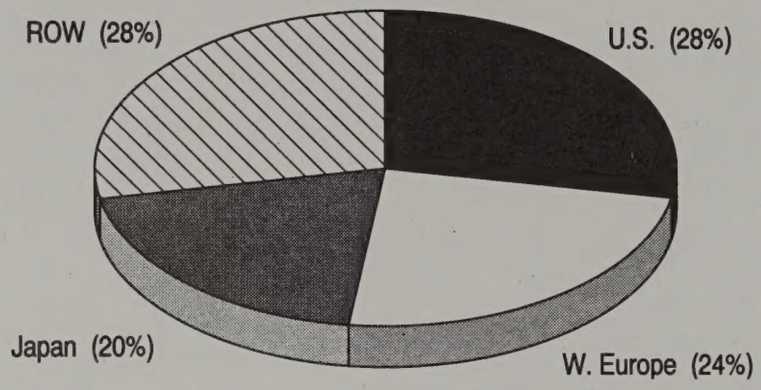
In some cases, the U.S. vendors operate their own offshore development centers. For example, Andersen Consulting has major development centers in the Philippines; Hewlett-Packard has one in India, and Lotus Development has development centers in both Ireland and Singapore.

Texas Instruments does almost all of its CAD/CAM and graphics development in India. This group operates with interactive development on computers in Texas via satellite channels. TI also has four or five other specialized development centers outside the United States in places such as Ireland and Israel.

Users and IS: The Offshore Decision

Perhaps nowhere are the benefits of offshore development more apparent than in the creation of large custom applications. Competition is limited, the project is fairly well bounded, and time-to-market is important, but not necessarily the most important factor to success. A single large customer might spec and design an application, then send it overseas for the coding.

Worldwide Contract Programming Services, 1992



Total = $32.3 billion

Source: International Data Corporation, 1993

In addition, the rightsizing and downsizing of industry has been accelerated by companies seeking cost-effective partnerships for products and services beyond core competencies. The emerging "virtual corporation" focuses on what it does best and most efficiently while relying on outside sources to fill the gaps.

Management today is focusing on how to perform and improve business processes, not on how to roll out information technology within the company. As a result, it is working to identify the processes within the organization that could be better managed by an outside party or outsourced.

Management is increasingly turning toward solutions made from some or all of the following: outsourcing services, application reengineering, client/server architectures, CASE and other development tools, interoperability, open-system standards, and object-oriented programming.

The challenge for U.S. companies interested in establishing offshore alliances is in distinguishing the skills offered by the many different suppliers. Many opportunities are won or lost by offshore suppliers on the basis of word-of-mouth reputation. In addition, a network of nationalities and family relationships are often the determining factor in which country or firm wins an offshore development job.

Strategies for Leveraging Expertise: Governments' Role

For the most part, offshore subcontractors have been inefficient in promoting their services, both within their own countries and abroad. Over the last 10 years, several countries have made a strong commitment to enhancing their competitiveness in the information technology industry by assuming the role of software service providers.

With the local market growing but still relatively small, a key objective is to export surplus expertise. Countries exporting software services include:

- China
- Egypt

- Hungary
- India
- Ireland
- Israel
- Pakistan
- The Philippines
- Russia
- Singapore
- Mexico

Case Study: India

The rapid pace of technological change, the search for the best value in labor, and unrelenting market competition are among the major reasons companies are looking for resources beyond their native borders. India has emerged as one source of offshore software development. Although countries such as Ireland, the Philippines, and Israel are also key offshore software providers, India is the largest and fastest-growing exporter of software services.

IDC projects India's software export revenue to reach $600 million by 1996 based on the country's current rate of growth. IDC anticipates that this ratio of growth should increase beyond its current rate, and that India's software services market will reach $1 billion by 1996.

Nurturing a Niche

Five to seven years ago the services India offered fell primarily into low-level, low-profit work. This included basic language conversions, COBOL development, "body shopping," and the like. As the business blossomed, the skill set was elevated, and the Indian software developers concentrated on increasing their deliverables and expertise. The Indian government, recognizing the potential for a worldwide "export," has contributed to the growth in Indian software development through funding and other support. As a result, many Indian firms now provide quality services in such high-demand areas as:

- Relational databases
- Database integration
- C++
- CASE tools
- Networking
- Unix
- Imaging
- CAD/CAM
- Client/server technology and environments
- Object-oriented programming
- Graphical user interfaces

The Key Players

Vendors without the overseas development centers work through alliances and joint venture relationships with the offshore firms. Some of the largest offshore development firms in partnerships with U.S. companies include:

- Complete Business Solutions, Inc. (CBSI)
- TATA Consulting Services (TCS)
- Blue Information Technology, Ltd.

Another example of a high-caliber offshore supplier is ITC, Ltd. ITC is a $1.5 billion Indian company that is a member of the U.K.-based BAT Group. ITC has hundreds of professionals supporting BAT operations worldwide and is developing software for major enterprises in the United Kingdom, Europe, and the United States. ITC also manages systems integration projects, including a mass-transit fare-collection system in Singapore.

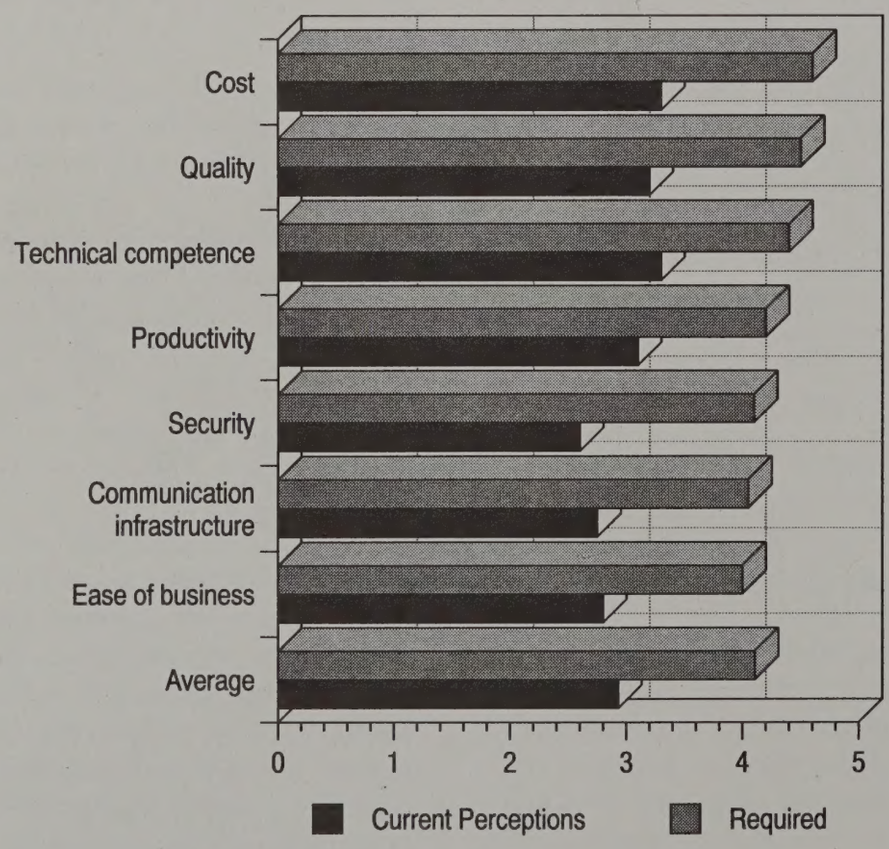
Information Management Resources, Inc. (IMR), based in Clearwater, Florida, is taking a slightly different approach. Claiming "leadership in offshore software services," the company relies heavily on Indian professionals in its own centers in Kerala and Bombay. IMR provides application development, documentation, training, project management, systems integration, software maintenance, software engineering, and transitional outsourcing. It provides these services directly to end users or through relationships with other service vendors. IMR says it offers a full range of quality software services for as much as 40% to 50% less than the competition.

Major International IT Companies with Offshore Software Development Projects

Many U.S. software suppliers are currently involved in offshore development projects in India, Ireland, Singapore, and elsewhere. The users of these offshore services include system and software vendors, system integrators, and IT consulting firms. Companies using offshore programming today include:

- Andersen Consulting
- IBM
- Bull Information Systems
- Hewlett-Packard
- AT&T
- Sybase
- Texas Instruments
- Digital
- EDS
- Price Waterhouse
- Apple Computer
- Lotus Development Corp.
- Computer Sciences Corp.
- Sun Microsystems, Inc.

User Ratings of Criteria for Doing Business with Indian Firms



This chart highlights the differences between requirements for and perceptions of Indian software developers. Companies that have hired Indian software development firms have found that technical competence, cost, quality, and productivity are less of a concern than security and communication issues.

Source: International Data Corporation, 1993

End-User Requirements for Offshore Developers

End users are also looking to take advantage of cost savings realized by offshore software development. Among Fortune 500 companies actively working with offshore firms are Citicorp, Sears, 3M, MONY, and General Electric. As with IT suppliers, many of these companies are employing Indian software development companies.

A common theme runs through these end users' experiences. Many of them would like to contract with a U.S.-based systems integrator for overall project management. The primary goal of the Indian software development alternative is to save money, but managing the risk associated with that alternative remains a concern.

Key Issues in Going Offshore

Software developers that have made a decision to go offshore still face many challenges to ensure a smoothly running operation. The following is a checklist of problem areas that end users and vendors should address to avoid the risks and take advantage of the rewards in using offshore software developers:

- *Do homework.* Learn as much as possible about the countries and companies offering these services. Each country has different specialties, pricing structures, political and economic barriers, and advantages to doing business. In addition, some have significant distance and communication barriers that must be understood upfront.
- *Clearly understand specific needs.* Evaluate your needs for offshore developers with the resources required to work with them. If your shop is not operating effectively, problems will be magnified when you try working with any outside firm. Naturally, this will limit the prospects for success from the start.
- *Get customer referrals.* After identifying a short list of companies, get as many referrals as possible. Talking to other companies with experience working with these firms helps to limit potential risks and surprises. Talk to their customers candidly about positive and negative corporate characteristics, methodologies, management philosophies, ethical standards, facilities, and financial stability.
- *Seek out "expert advisors" to maximize the chances for success.* Consider working with intermediary agents or consulting firms. As the demand for offshore development services increases, so does the supply of consultants and advisors that help firms to choose an appropriate partner. These firms can be extremely useful, at least on the first project, to help screen the list of prospective subcontractors or advise on the contractual arrangements.
- *Do cost/benefit analysis.* In doing the cost/benefit analysis, use a fully burdened cost. All quantitative and qualitative costs, not just raw manpower expenses, must be factored into the analysis. Decide on a return of investment up front and establish objective criteria to measure this through the project phases.
- *Start small and build from there.* Starting with small, well-phased projects at your own site is often beneficial. In addition, put your best people in charge of the management/alliance relationship. It is easier to do all you can on your side to make sure things run smoothly.
- *Maintain excellent communications.* Closely monitor the projects through completion and plan for postimplementation support. Good communication is essential if you want to deliver an on-spec, high-quality, on-time, and on-budget project. It is important to be particularly sensitive to time zone differences, local customs and holidays, cultural differences, and language interpretation issues.
- *Do end-to-end measurements.* At the project's conclusion, review the entire set of procedures to evaluate elements of success and failure. Then, measure the end results against the original business plan. Make decisions regarding the next steps accordingly.
- *Show, tell, and learn some more.* Sharing the experience with industry peers helps improve the process. Some firms have gone so far as to even publicize the results.
- *Think and invest long term.* Look for long-term relationships with the right companies. Experiment with different and/or larger projects with those partners. Look for ways in which to respond jointly to new offshore market opportunities.

Offshore Software Suppliers: Brand Names Are Next

Since the early 1980s PC companies have been buying components from international suppliers to keep prices down, and to get a leg up on all-domestic producers. Over the next 10 years software production will make a similar migration offshore.

Offshore producers began to make an impact on the U.S. industry in the early 1980s. Until that point, almost all U.S.-based companies' IT products were conceived, designed, and manufactured in the United States. The first offshore-produced products were relatively low-tech components and supplies. Then came monitors, disk drives, and memory.

As offshore manufacturing capabilities grew, competition in the PC industry heightened. Low-cost suppliers had a significant advantage. Because the PC industry showed at least some signs of price elasticity (compared to larger systems) margins became a significant competitive advantage.

Now significant portions of PCs sold in Europe, Japan, and the United States are made from components manufactured offshore. Hundreds of companies OEM systems from offshore suppliers. The largest offshore producers are going even further. They are building global brand names. Companies like Acer, Hyundai and Samsung are vying to compete with many of the downstream companies they used to supply.

A similar sequence of events will happen on the software side of the business. The geographic dispersal and globalization of the software industry has been following an evolutionary transition not unlike that of hardware . . . only ten years later.

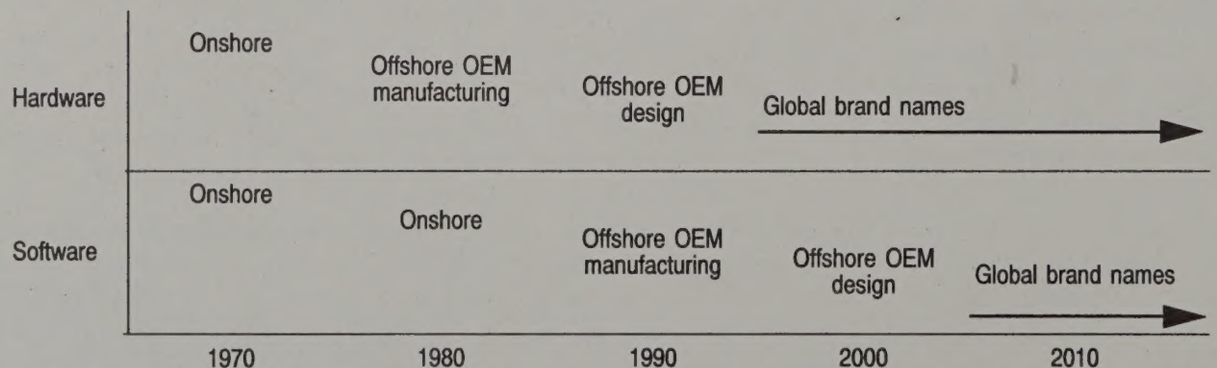
Today, offshore outsourcing of large contract programming jobs is commonplace. And more companies are establishing tighter relationships with offshore programmers, the software analogy to a hardware OEM relationship.

Small international developers haven't cracked the biggest PC software markets yet, and they probably never will. Word processing or spreadsheet software markets, for example, are quite mature. But they very well may thrive in and even dominate small and growing niche opportunities.

For example, Trend Micro Devices of Taiwan sells antivirus programs that are consistently ranked best of breed. Trend's applications are resold in the United States under the Intel logo. Updates, improvements and new releases are brought to market faster than competitors' products in part because Trend's software engineers are based in Taipei. Trend can afford to keep more antivirus experts on staff than its U.S.-based competitors. Another Taiwanese company, U-Lead Systems, writes Windows-based still and video image-management applications that are pushing the limits of non-Mac multimedia. It too benefits from low development costs.

The ultimate result will be brand-name software packages and producers that rival U.S. companies the same way that Acer, Hyundai, and Samsung now compete with IBM, Compaq, and Apple. Technical competence, low-cost production, and nimble decision making will make up for the global mindshare and channel presence they now lack.

IT Design and Manufacturing: The Offshore Migration



Source: International Data Corporation, 1993

THE GRAY SHEET
Computer Industry REPORT

DOUG McLEOD, EDITOR | August 27, 1993 | VOL. 28, NO. 20-21 | Published continuously since 1964.

A Pictorial Perspective on 30 Years of Change

IN THIS ISSUE:

A Pictorial Perspective on 30 Years of Change 1
Transistor Chip Density in Intel Microprocessors, 1972–1993 2
Storage Capacity (MB) Growth, 1975–1993 3
MIPS Growth in Intel Processors, 1974–1993 4
DRAM Chip Capacity 1971–1996 5
Relative Performance Growth of Four Key Technologies: Transistor Density, DRAM, MIPS, and Magnetic Storage, 1971–1993 6
U.S. Market for Multiuser and Single-User Systems, 1964–1996 7
PCs in Use Worldwide by Processor Type, 1981–1993 8
Worldwide PC Unit Shipments by Intel and Compatible Processor Type, 1981–1993 9
The Invasion of 32-Bit Machines 10
Worldwide PC Network Interface Card Market Shipments, 1985–1993 10
Worldwide Modem Shipments by Speed, 1980–1992 11
Worldwide Installed Base of Network Nodes, 1991–1995 11
Storage Explosion: Worldwide Captive and Noncaptive MB Shipped, 1987–1996 12
Dramatic Price Declines: Average Prices of Selected Hard Disk Drives, 1987–1996 12
IBM's Information Technology-Related Revenue and Overall Worldwide IT Market Share, 1965–1992 13
Worldwide IT Market by Region, 1991 and 1996 14
Worldwide IT Market by Hardware/Software Categories, 1991 and 1996 14
Beyond Sequential Processing: Parallel Machines May Provide Next Big Performance Jump 15
The Plunging Price of Mainframe MIPS 15
Employment in Software- and Hardware-Oriented Occupations in U.S. User Organizations, 1972–1988 16
Population and Communication Technology Penetration: A Wide Gap Narrowing Slowly 16
Worldwide Multiuser Systems Installations, 1987–1997 17
Worldwide Multiuser Systems, Value of Shipments, 1987–1997 17
Real and Nominal Growth of the U.S. Hardware Market, 1972–1992 18
United States IT Market by Major Category, 1969–1992 19
Penetration of Major Electronic Media in the United States, 1984–1992 20

What percentage of the worldwide population uses some kind of PC? How does that compare to ten years ago? When did Unix server sales overtake sales of other midrange systems? Is spending on mainframes really declining? How fast? Where?

Every week IDC provides its clients with facts and figures that illustrate change in the IT industry. These include questions about how new products have fared, or how trends like downsizing, outsourcing, and networking have overtaken industry tradition. Often we are asked if we have historical evidence of how such longer-term dynamics have effected change.

The information is typically needed for presentations, press releases, marketing backgrounders, and reports. More generally it is needed to answer one of four questions:

- How much further can the industry grow?
- How will growth across specific portions of the industry vary?
- How far has the industry grown over the past 30 years?
- How will a new product or new technology fare, compared to past products?

In preparation for the 30th anniversary of the Gray Sheet, we have assembled a broad range of data from an even broader array of internal and external sources to publish 27 charts and graphs that highlight the state of the IT industry, c. 1993. This issue provides a visual perspective on many of the above questions.

The charts that appear in this issue are intended for reuse. They may be reproduced and distributed, with appropriate IDC citations. Camera-ready artwork and electronic versions of the charts are available for an additional fee. Please turn to page 20 for details.

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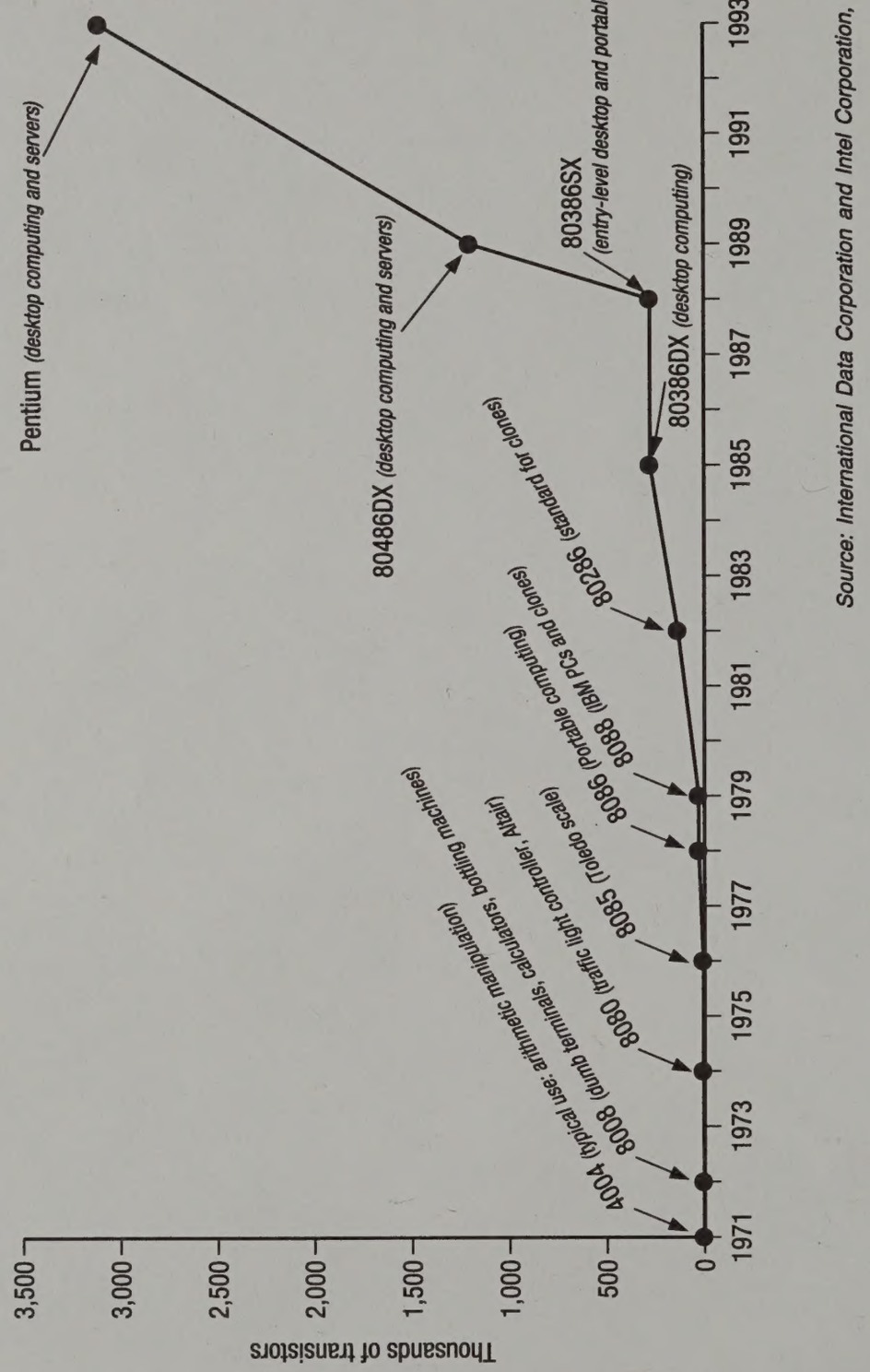

One reason Intel's Pentium is so much faster than the 486 chips is because Intel crammed over three times as many transistors into the same area. That in turn allowed Intel to take functions off the board and put them right onto the chip, reducing I/O waiting. The next generation of Intel chips will likely include sophisticated compression/decompression and digital video algorithms in silicon — a multimedia computer on a chip.

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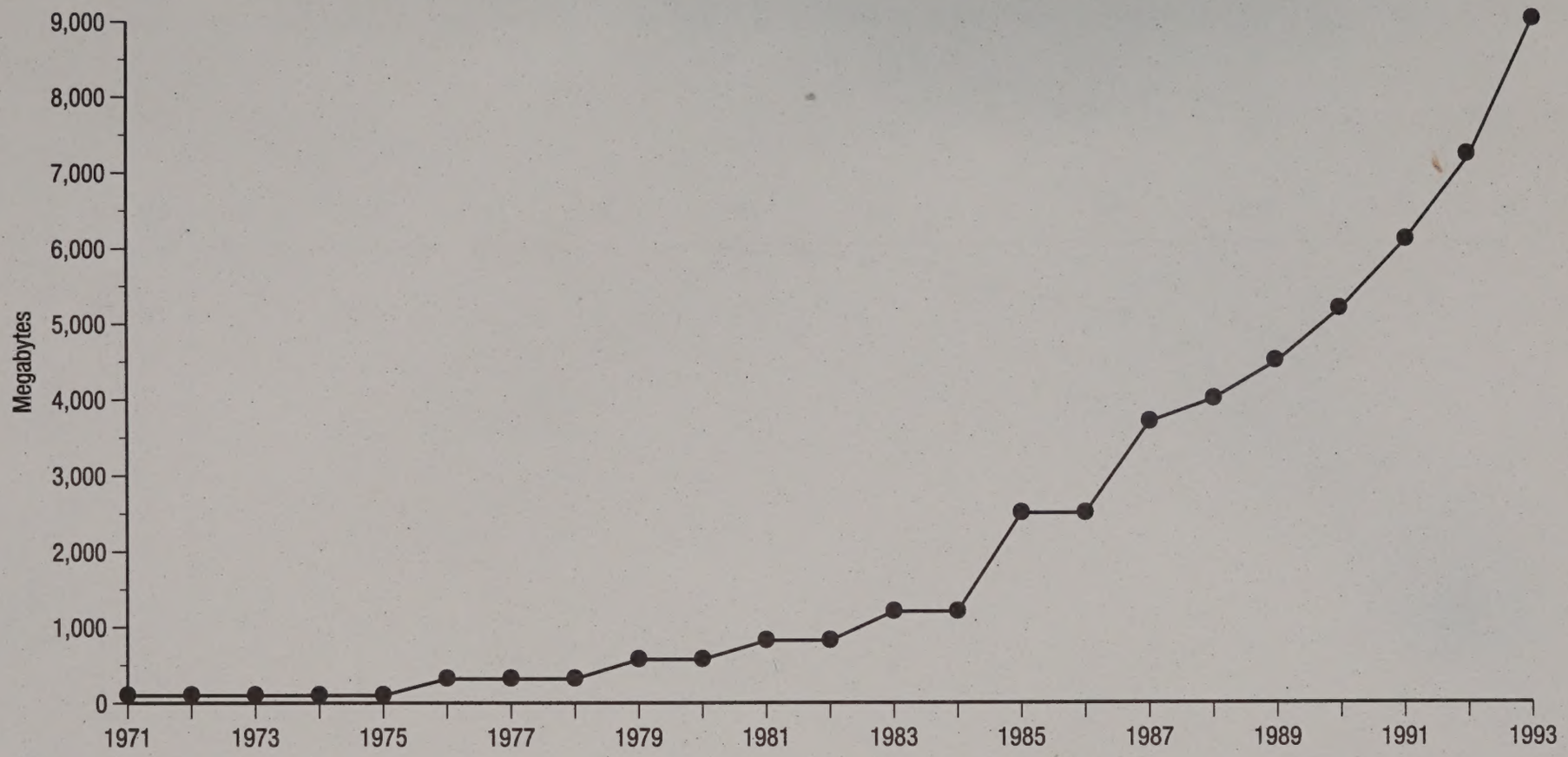
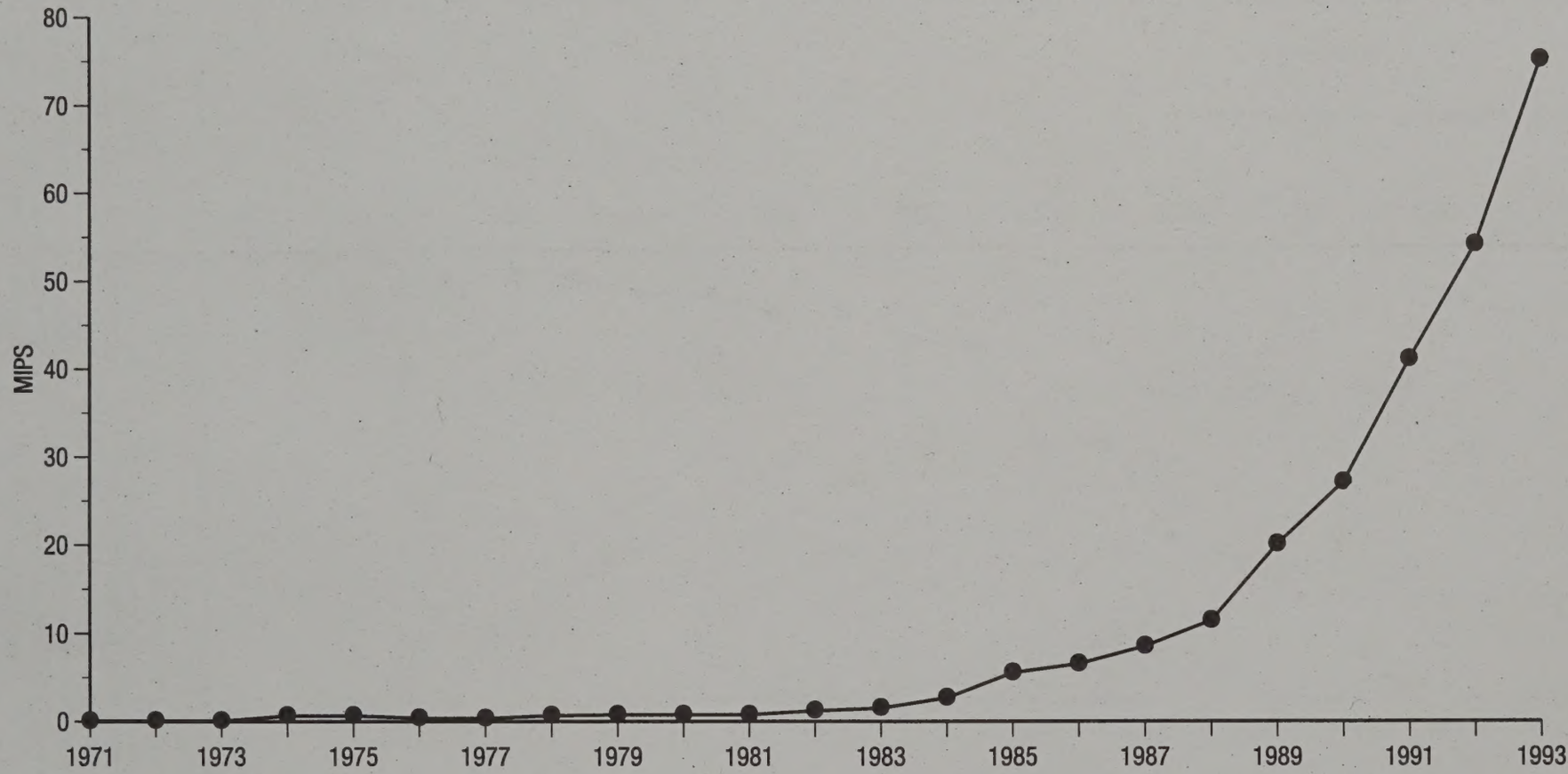
Storage Capacity (MB) Growth, 1975–1993



Source: International Data Corporation, 1993

Lacking a consistent method for incorporating advances in nonmagnetic storage medium (most notably optical devices) the growth in storage performance (measured in both aerial density and overall capacity) is somewhat slower than that of chip technologies. This chart illustrates advances of single-spindle magnetic storage devices at the high end of the market.

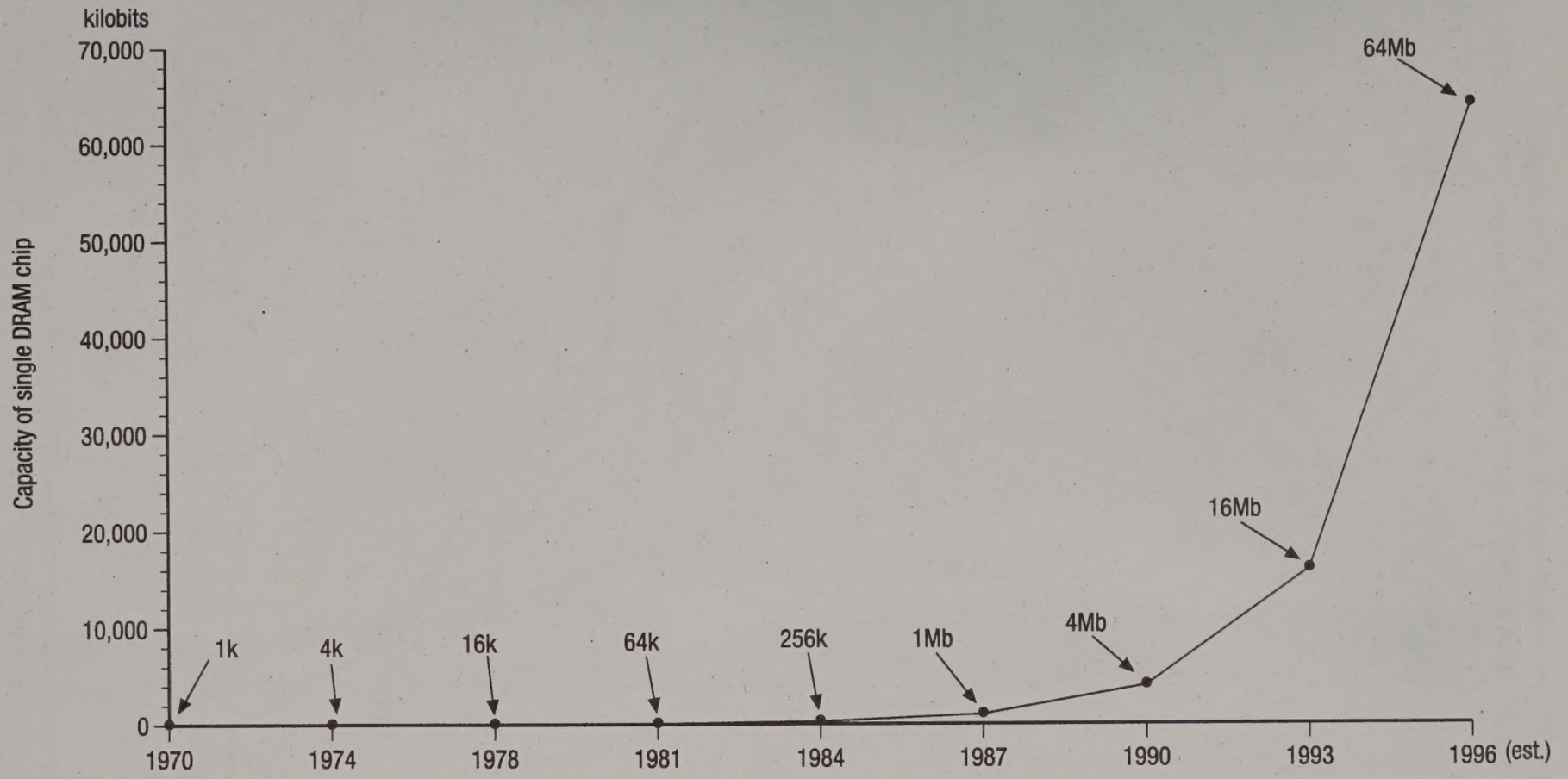
MIPS Growth in Intel Processors, 1974–1993



Source: International Data Corporation, 1993

Performance advances in Intel microprocessors has been a direct function of increasing transistor density. While performance measured in MIPS across families of microprocessors can lead to inaccurate comparisons, it can be used to clearly demonstrate improvements within a single processor architecture.

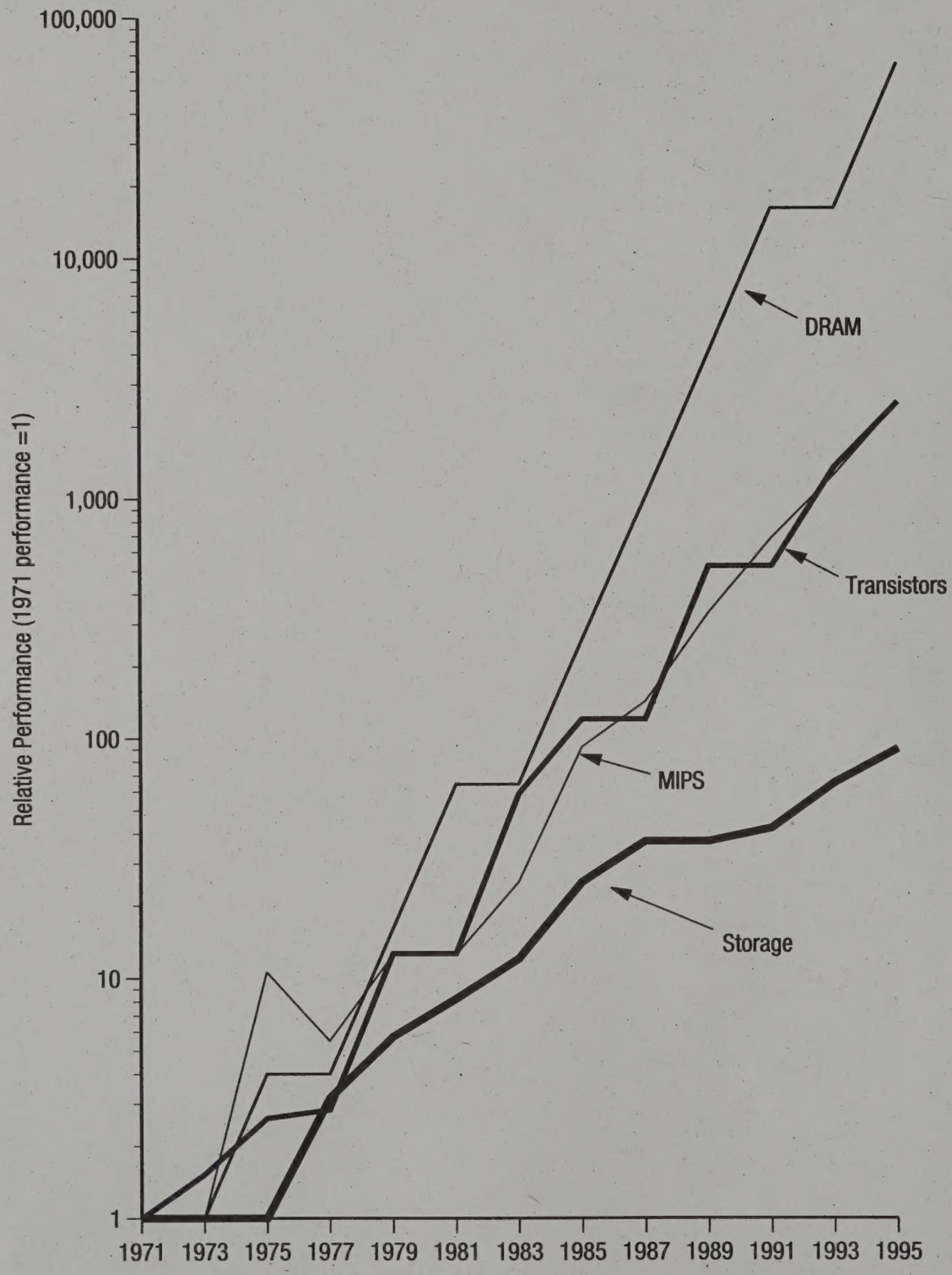
DRAM Chip Capacity 1971–1996 (est.)



Source: International Data Corporation and Intel Corporation, 1993

DRAM capacity is a direct function of transistor density. DRAM capacity has grown faster than any other computer technology.

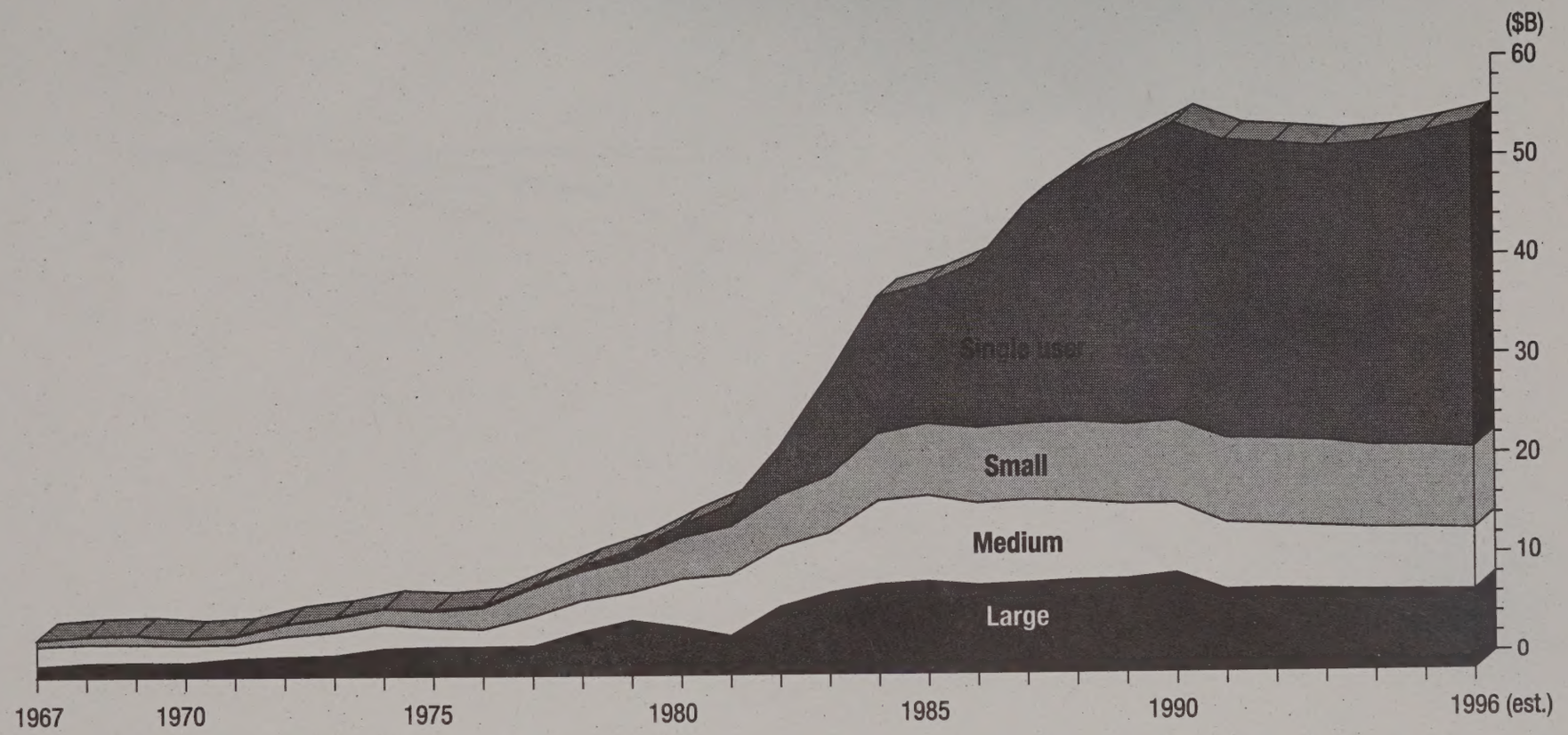
Relative Performance Growth of Four Key Technologies: Transistor Density, DRAM, MIPS, and Magnetic Storage, 1971–1993



Source: International Data Corporation, 1993

In this chart the performance of the four technologies are indexed to 1971 levels to provide a relative measure of increases. Not surprisingly, transistor density (which drives, in part, MIPS performances and DRAM capacity) has grown faster than magnetic storage.

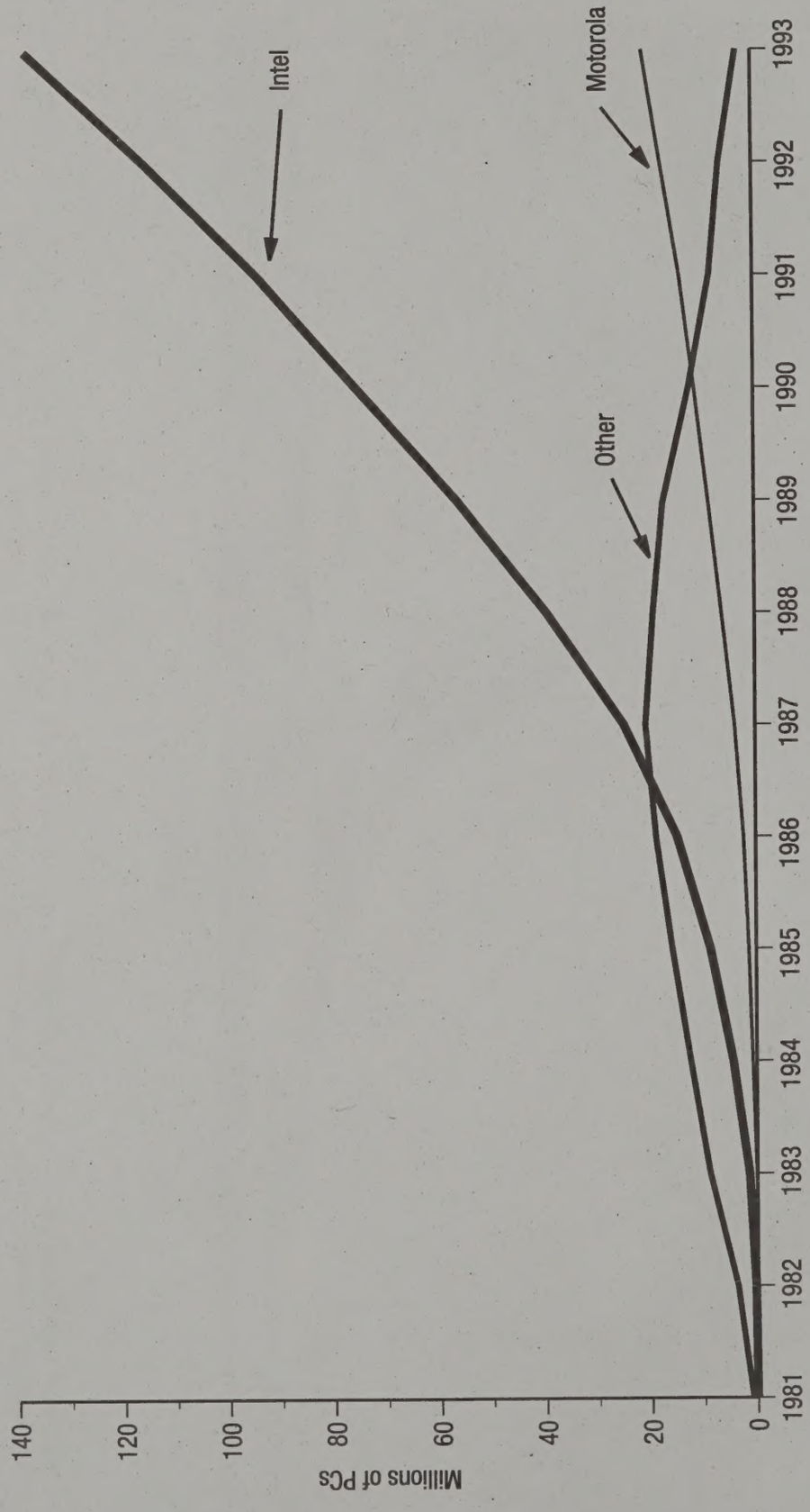
U.S. Market for Multiuser and Single-User Systems, 1964–1996 (est.)



The explosive growth of the PC market from 1981 onwards has come at the expense of other types of systems — usually larger mainframes and minicomputers — although the low end of the multiuser systems market has also seen slowed growth. After four years of moderate growth through 1985, spending on all multiuser systems has completely flattened. It is not expected to rebound over the next five years. The biggest loser: large systems, which have decreased from as much as 40% of the overall systems market in 1979 to well under 20% today.

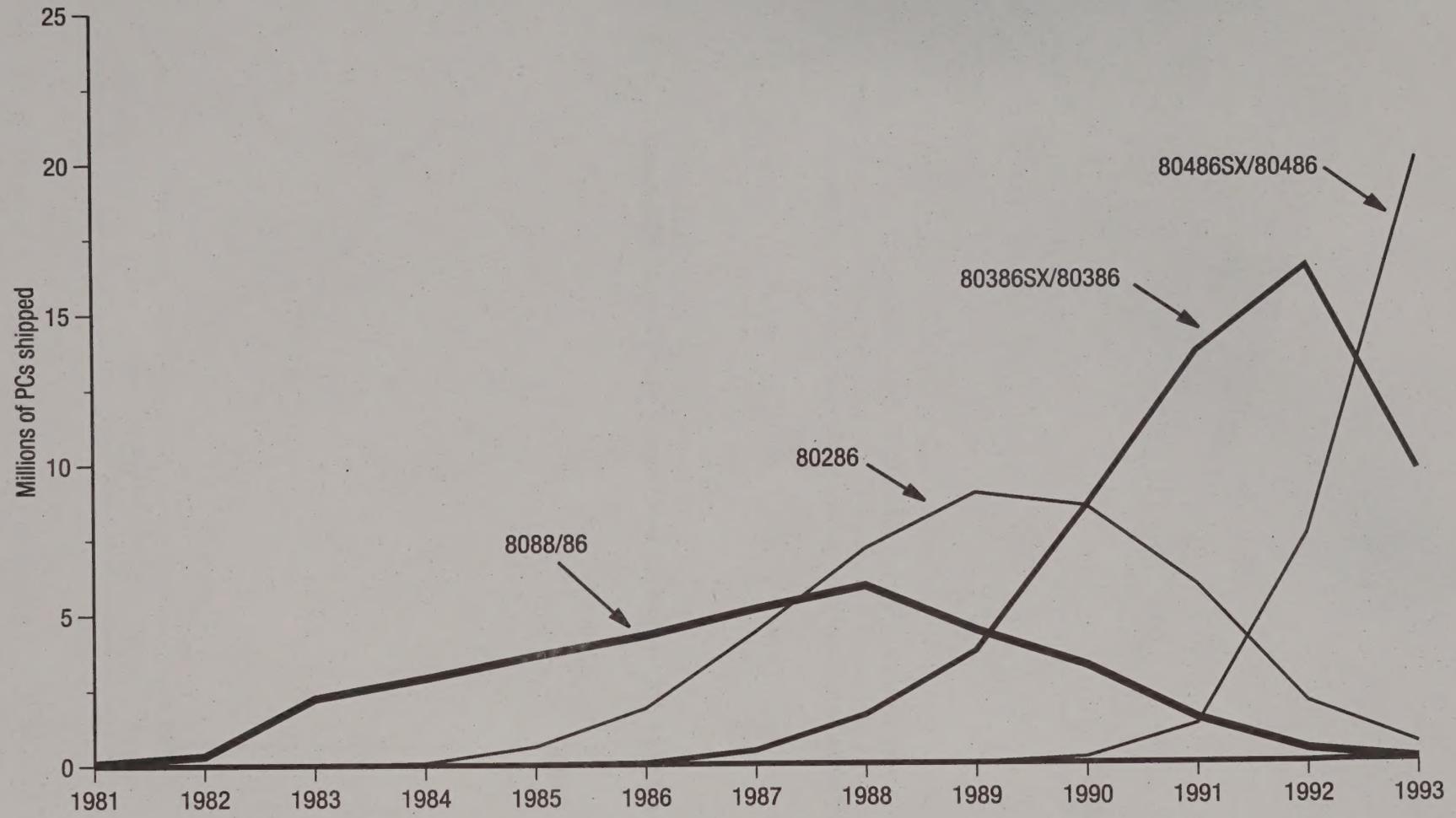
Source: International Data Corporation, 1993

PCs in Use Worldwide by Processor Type, 1981–1993



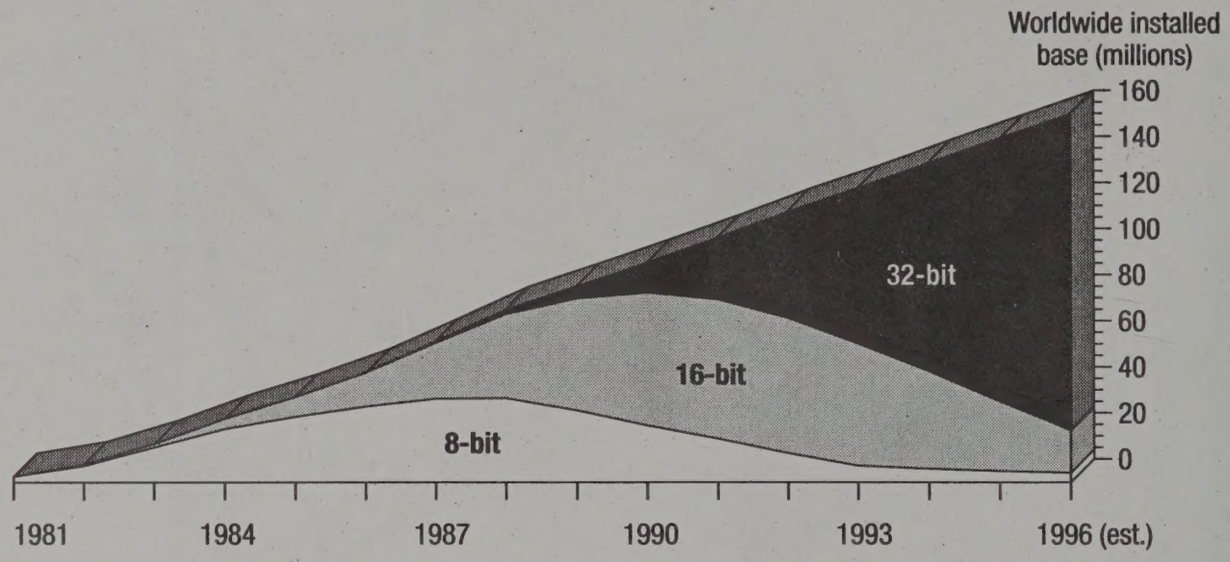
Source: International Data Corporation, 1993

Worldwide PC Unit Shipments by Intel and Compatible Processor Type, 1981–1993



Source: International Data Corporation, 1993

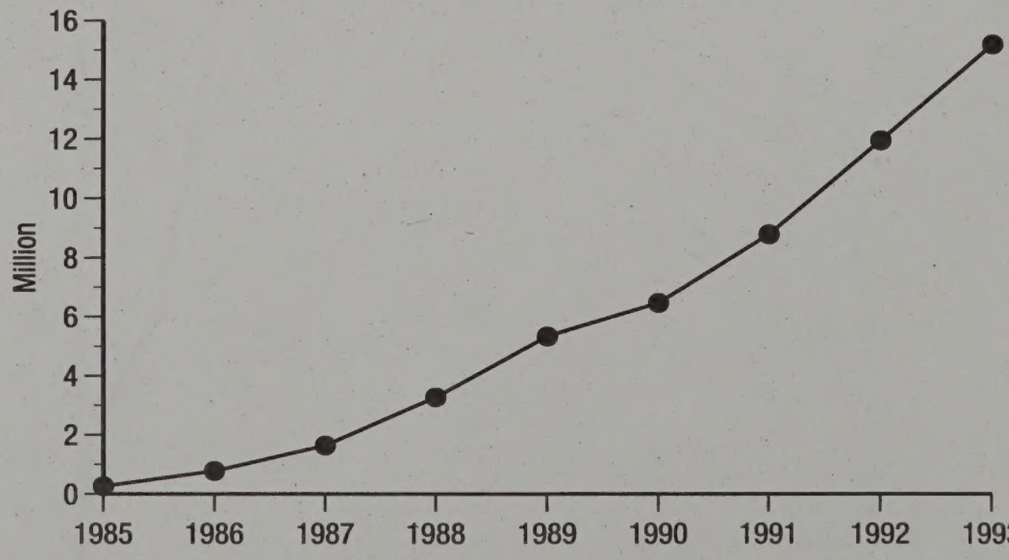
The Invasion of 32-Bit Machines



Source: International Data Corporation, 1993

Sometime this year the worldwide installed base of 32-bit PCs based on the Intel architecture (starting with the 386) will surpass that of 16-bit PCs. Between now and 1996 almost 100 million 32-bit computers will be added to that base.

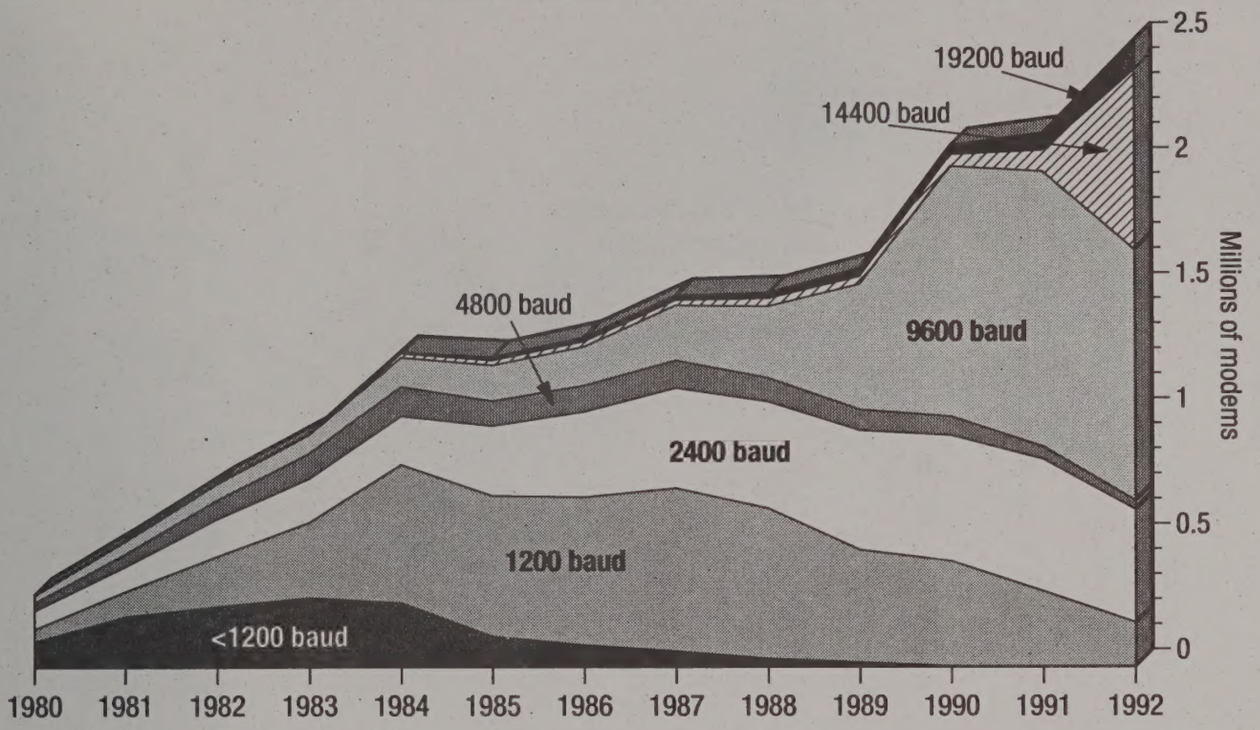
Worldwide PC Network Interface Card Market Shipments, 1985–1993



Source: International Data Corporation, 1993

Penetration of PC network interface cards is expected to continue growing through the end of the decade.

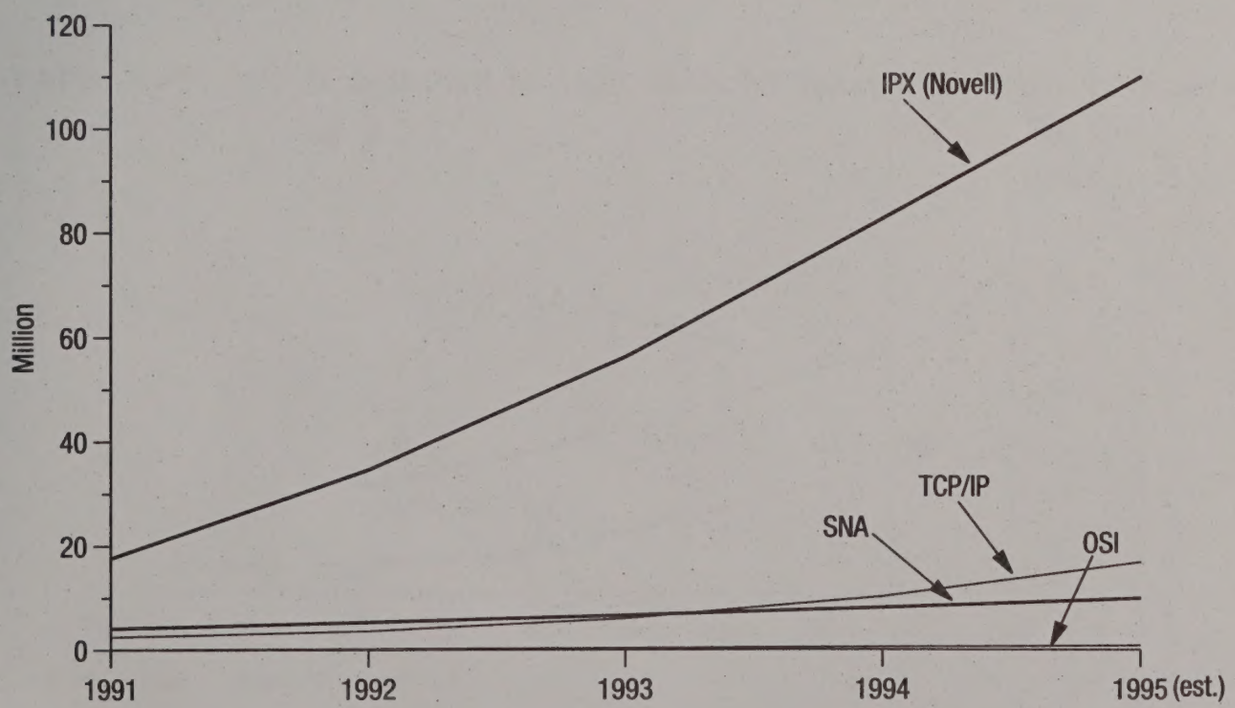
Worldwide Modem Shipments by Speed, 1980–1992



Source: International Data Corporation, 1993

Almost two-thirds of all modems sold worldwide in 1993 will be 9600 baud or faster.

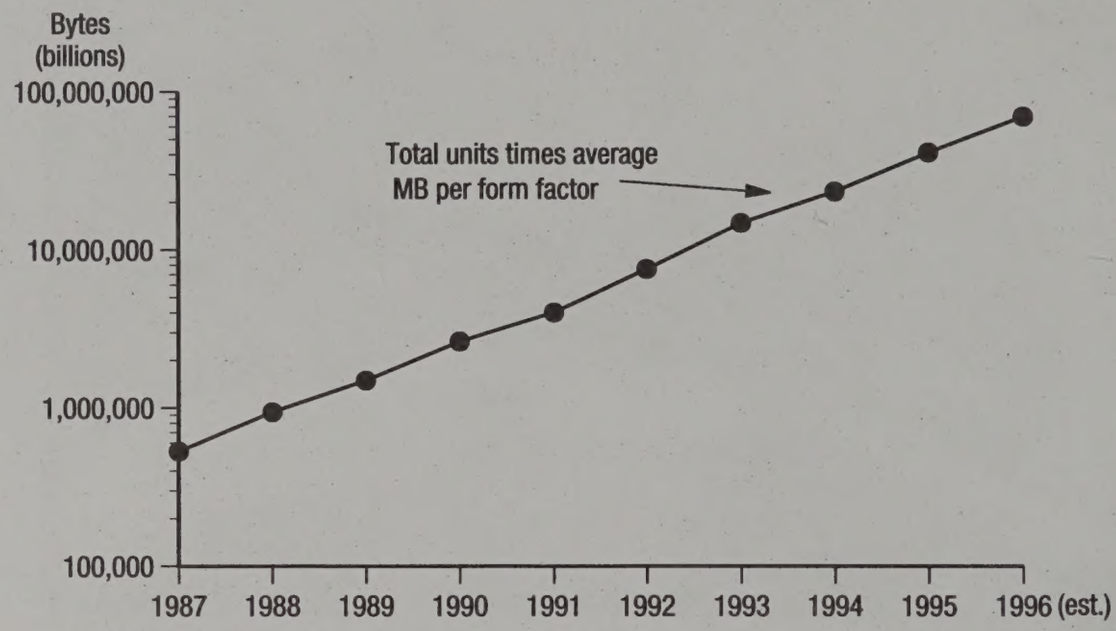
Worldwide Installed Base of Network Nodes, 1991–1995 (est.)



Source: International Data Corporation, 1993

Despite the huge interest in TCP/IP, Novell's IPX remains the most widely-used architecture for connection to a network.

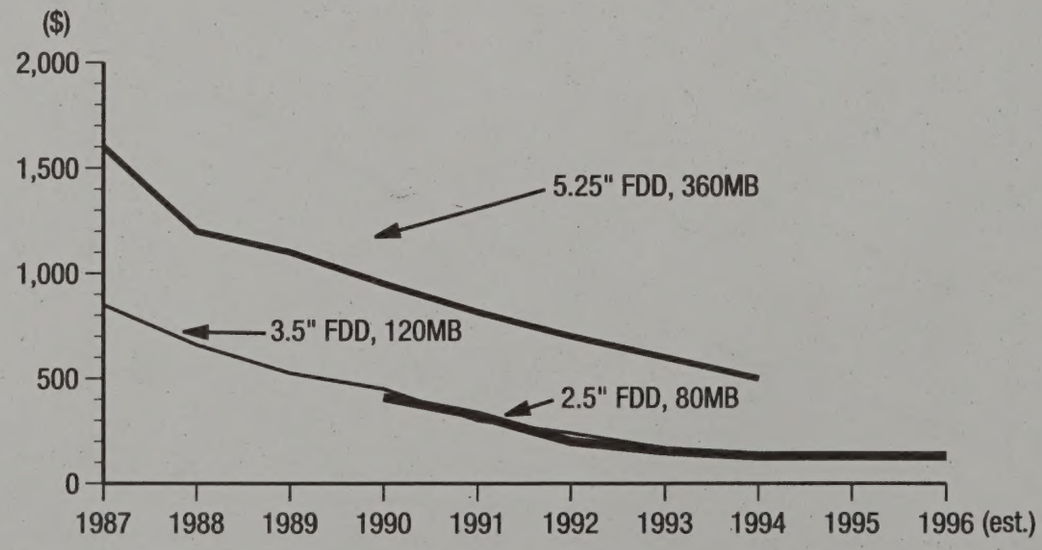
Storage Explosion: Worldwide Captive and Noncaptive MB Shipped, 1987–1996 (est.)



Source: International Data Corporation, 1993

The growth of the storage business is one good measure of the speed of change in the IT industry. This chart shows the exponential growth of all magnetic disk storage capacity projected for a ten-year period.

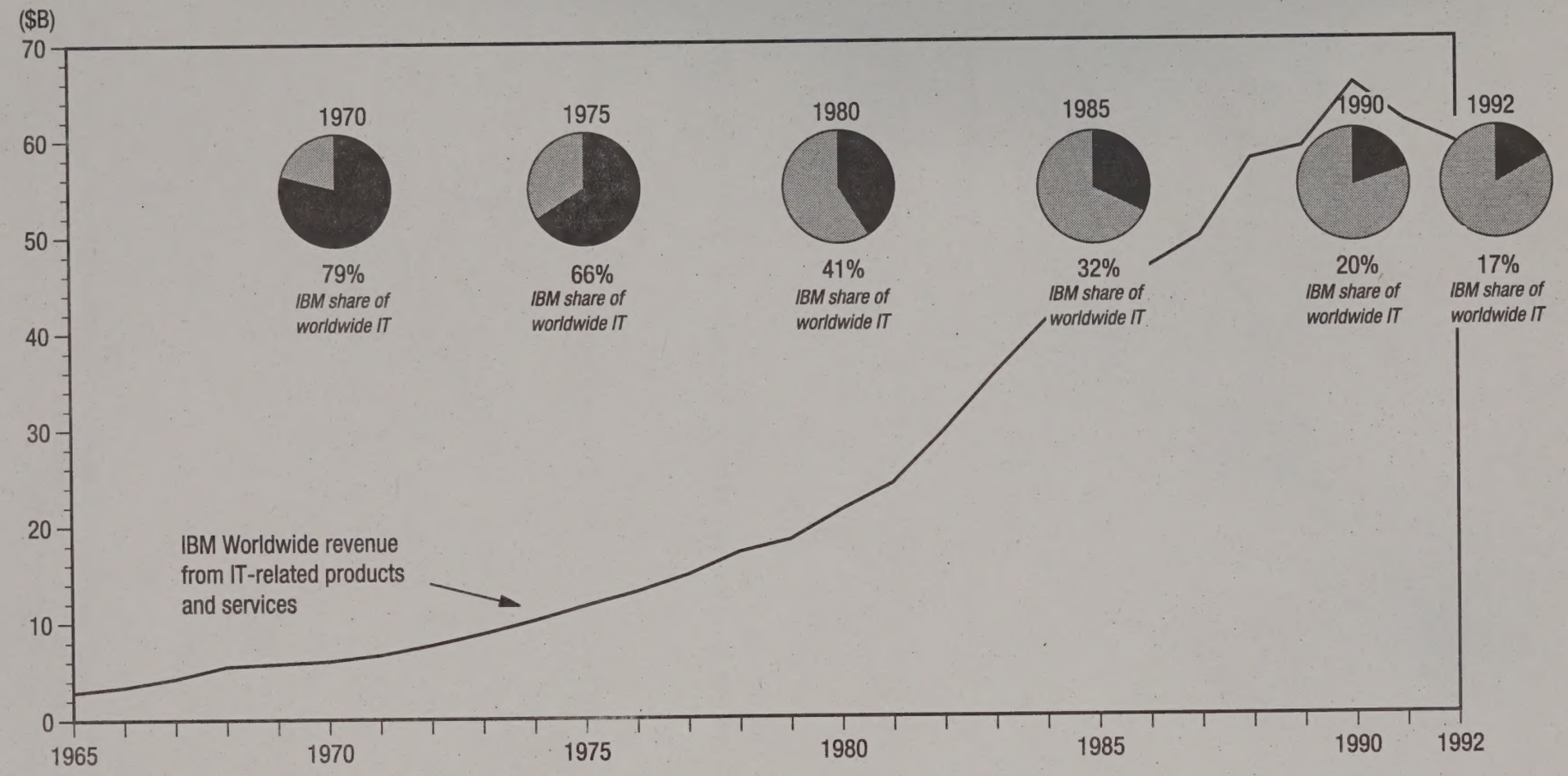
Dramatic Price Declines: Average Prices of Selected Hard Disk Drives, 1987–1996 (est.)



Source: International Data Corporation, 1993

While the technology of data storage and retrieval may not have made as dramatic performance improvements as other technologies (see page 5), prices continue to decline steadily. Real cost per megabytes has dropped at least three-fold since 1987.

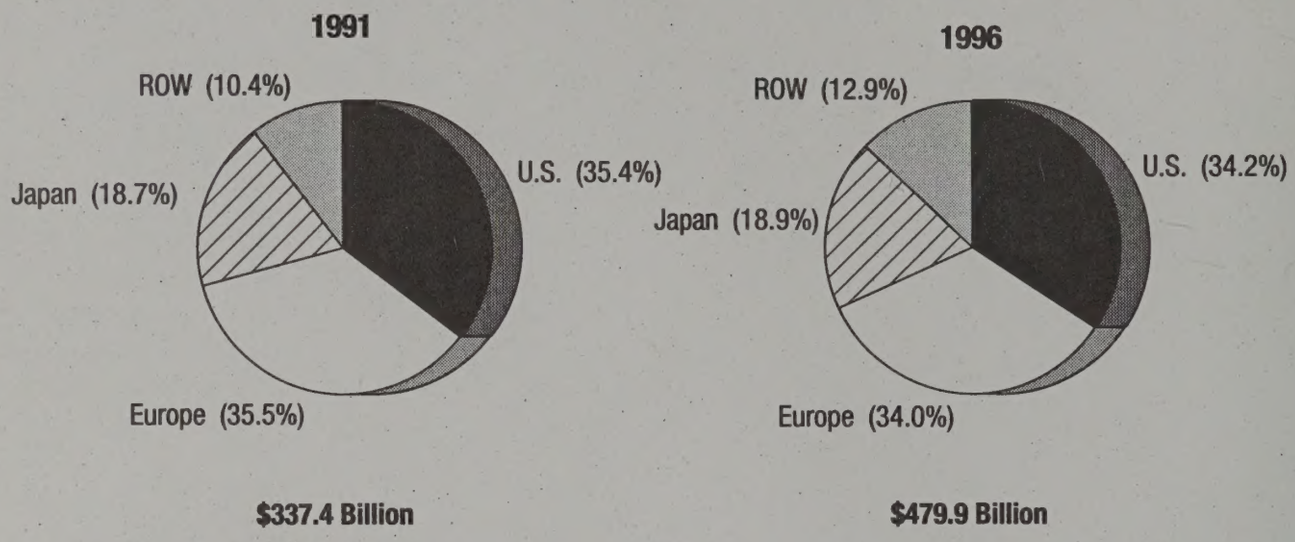
IBM's Information Technology-Related Revenue and Overall Worldwide IT Market Share, 1965–1992



IBM is no stranger to declining market share. Even before the disappointing results of the past two years, IBM has seen its influence in and dominance of the worldwide IT industry dissipate. A scant eight years ago IBM was responsible for almost one-third of the entire IT industry. Twenty years ago it accounted for three-quarters of the industry, and it drew the attention of federal regulators, who gave serious and expensive consideration to mandating the divestiture of certain lines of IBM's business. For comparison, Microsoft's current share of the worldwide desktop operating system market, by far the largest, is estimated at over 90%.

Source: International Data Corporation, 1993

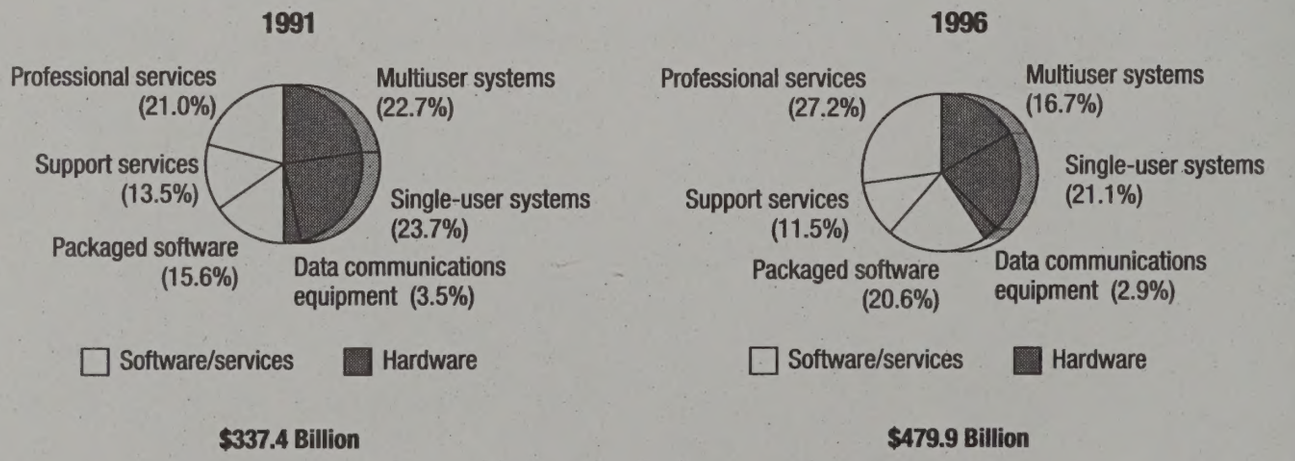
Worldwide IT Market by Region, 1991 and 1996 (est.)



Source: International Data Corporation, 1992

By 1996 developing-country markets for IT are expected to account for almost 13% of the total worldwide IT market.

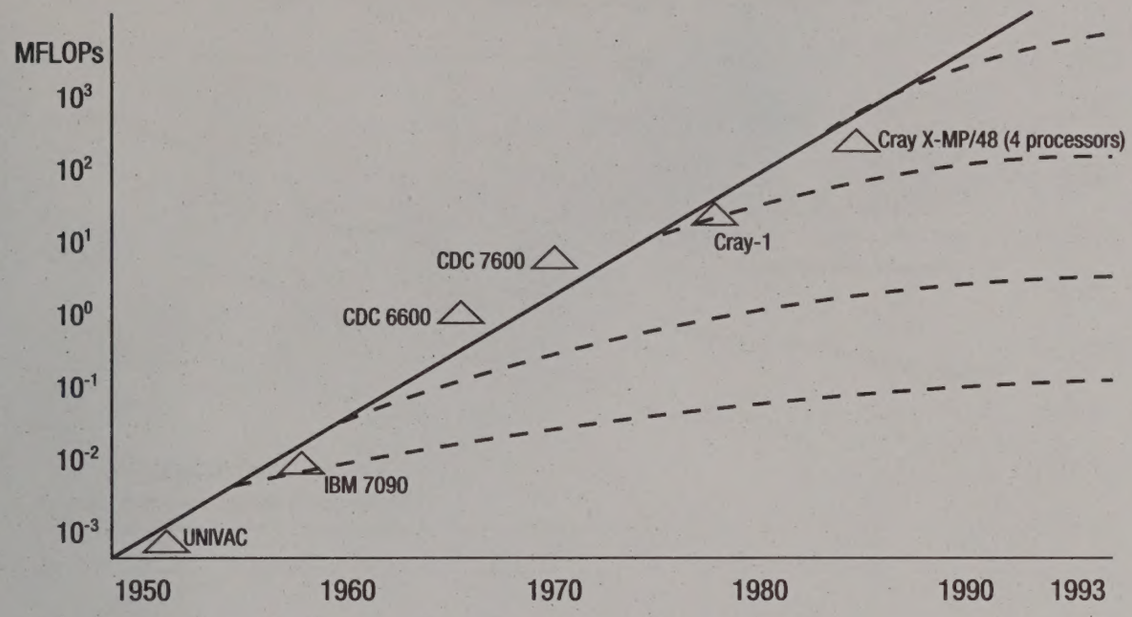
Worldwide IT Market by Hardware/Software Categories, 1991 and 1996 (est.)



Source: International Data Corporation, 1992

By 1996 hardware is expected to shrink to only 38% of the entire worldwide market for IT. Professional services and packaged software represent the two areas of greatest opportunity in the industry. They will go from 36% in 1991 to 47% of the market in 1996.

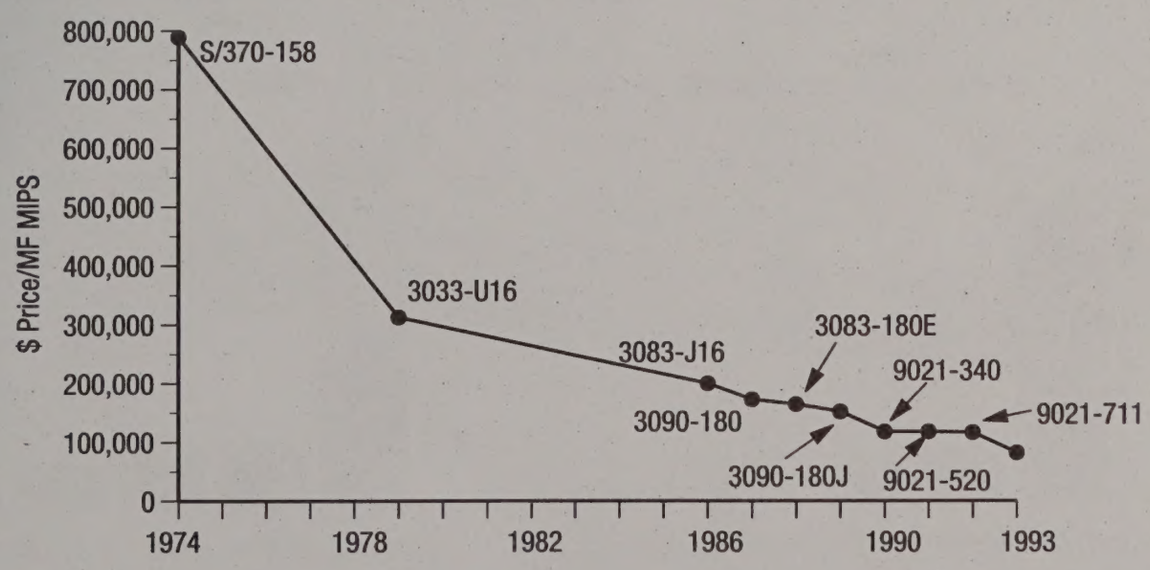
Beyond Sequential Processing: Parallel Machines May Provide Next Big Performance Jump



Source: Intel Corporation, 1986, and International Data Corporation, 1993

Sequential processing systems continue to make huge leaps in performance, but may soon meet a practical limit somewhere near 1,000 MFLOPS. Parallel processing technology may boost a new class of systems over these limits.

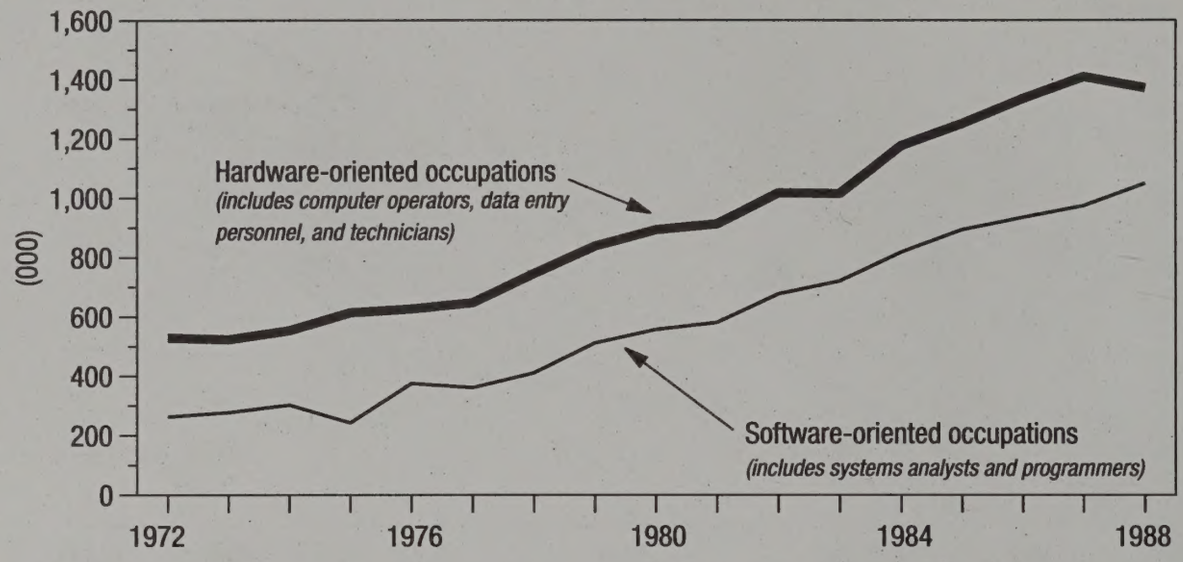
The Plunging Price of Mainframe MIPS



Source: International Data Corporation, 1993

The average street price (i.e., after discounting) of MIPS has declined by over one-third in the past ten years. However, during that period microprocessor performance has grown far more quickly. As a result, compared to the more-rapidly declining cost of microprocessor-based computing, mainframe MIPS appear to have held fairly steady for over a decade.

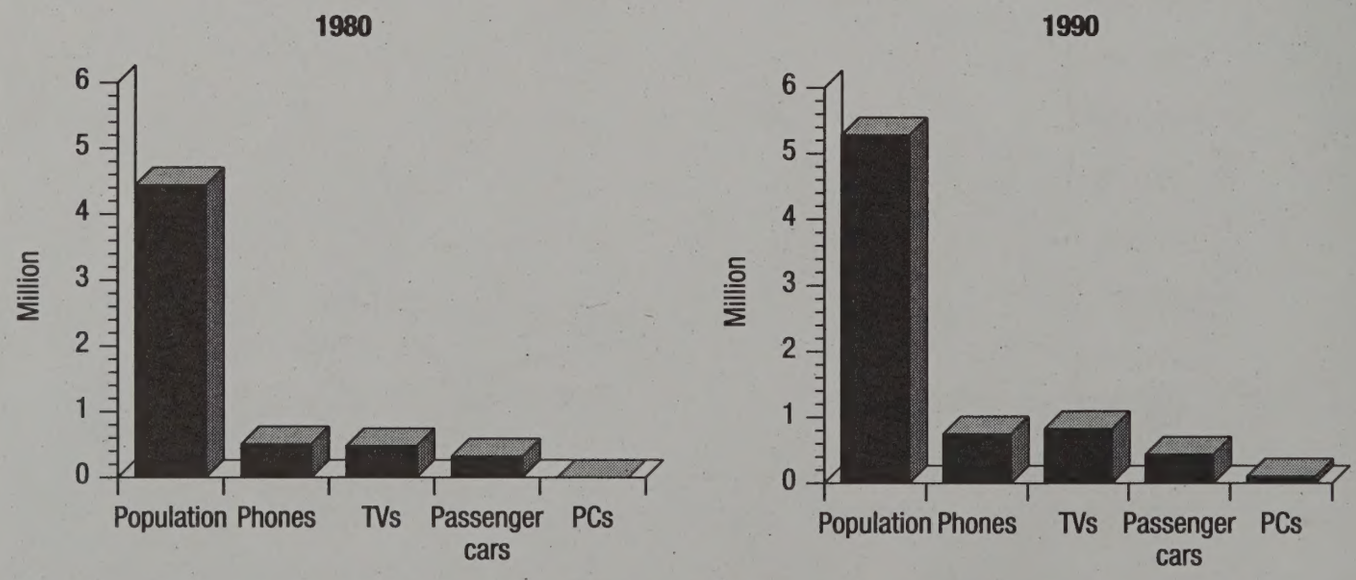
Employment in Software- and Hardware-Oriented Occupations in U.S. User Organizations, 1972–1988



Source: CBEMA, Industry Marketing Statistics

Hardware-oriented occupations and software-oriented occupations have shown similar rates of growth between 1972 and 1988. The recent narrowing of the gap is likely to continue as systems software becomes increasingly complex and as the number of software applications grows. In addition, automated data entry and more reliable hardware are eliminating some traditional hardware-oriented jobs.

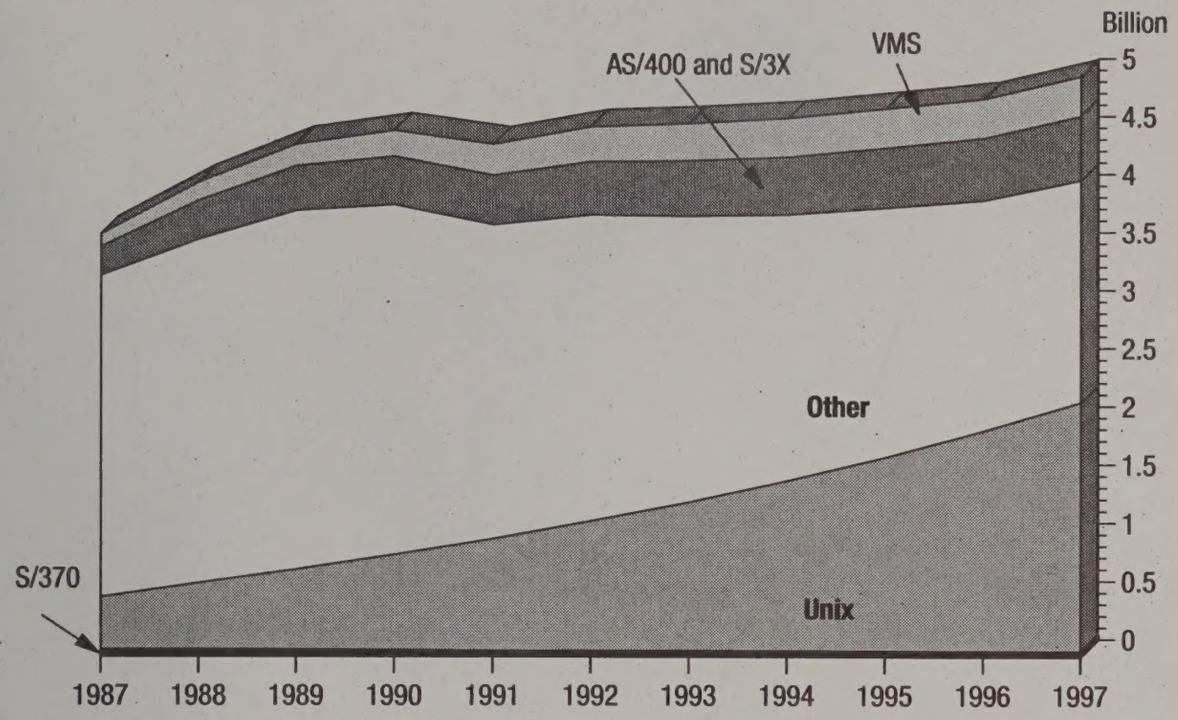
Population and Communication Technology Penetration: A Wide Gap Narrowing Slowly



Source: International Data Corporation and European/International Marketing Data and Statistics, 1993

PCs are still used by a far smaller percentage of the worldwide population than television and telephones. PC penetration is closer to passenger car penetration than to its electronics brethren. Even if current PC penetration rates are doubled, the 2000 chart will still show a wide gap between the three technologies. Of perhaps even greater interest, however, is the wide gap between all technologies and the total population.

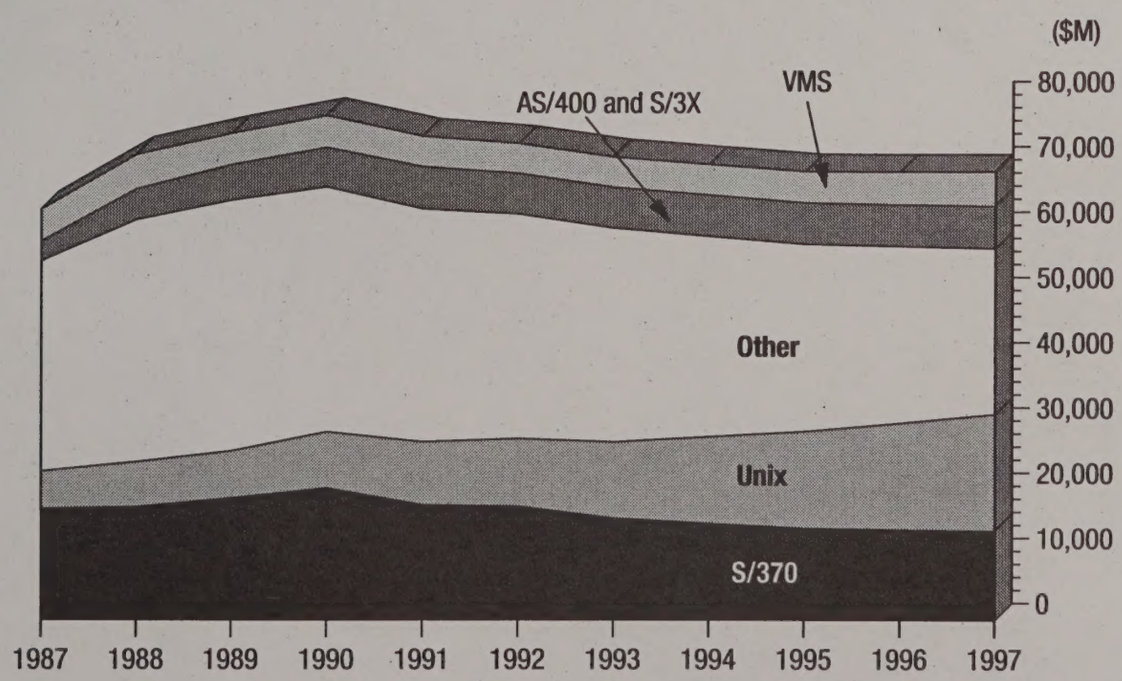
Worldwide Multiuser Systems Installations, 1987–1997



Source: International Data Corporation, 1993

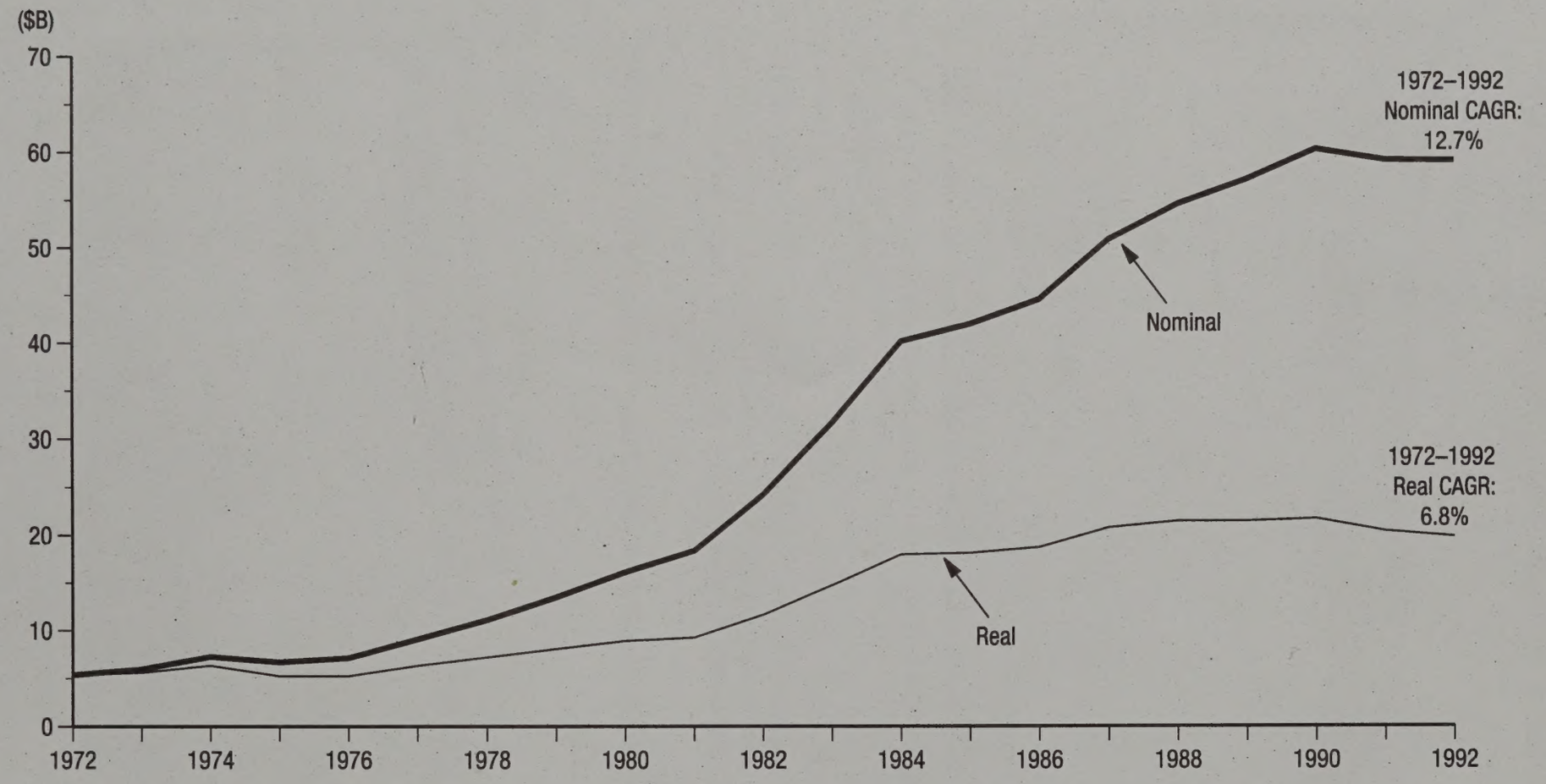
While IBM mainframe systems account for only a tiny portion of worldwide multiuser system sites (above), they account for a significant proportion of overall spending on computer systems (below).

Worldwide Multiuser Systems, Value of Shipments, 1987–1997



Source: International Data Corporation, 1993

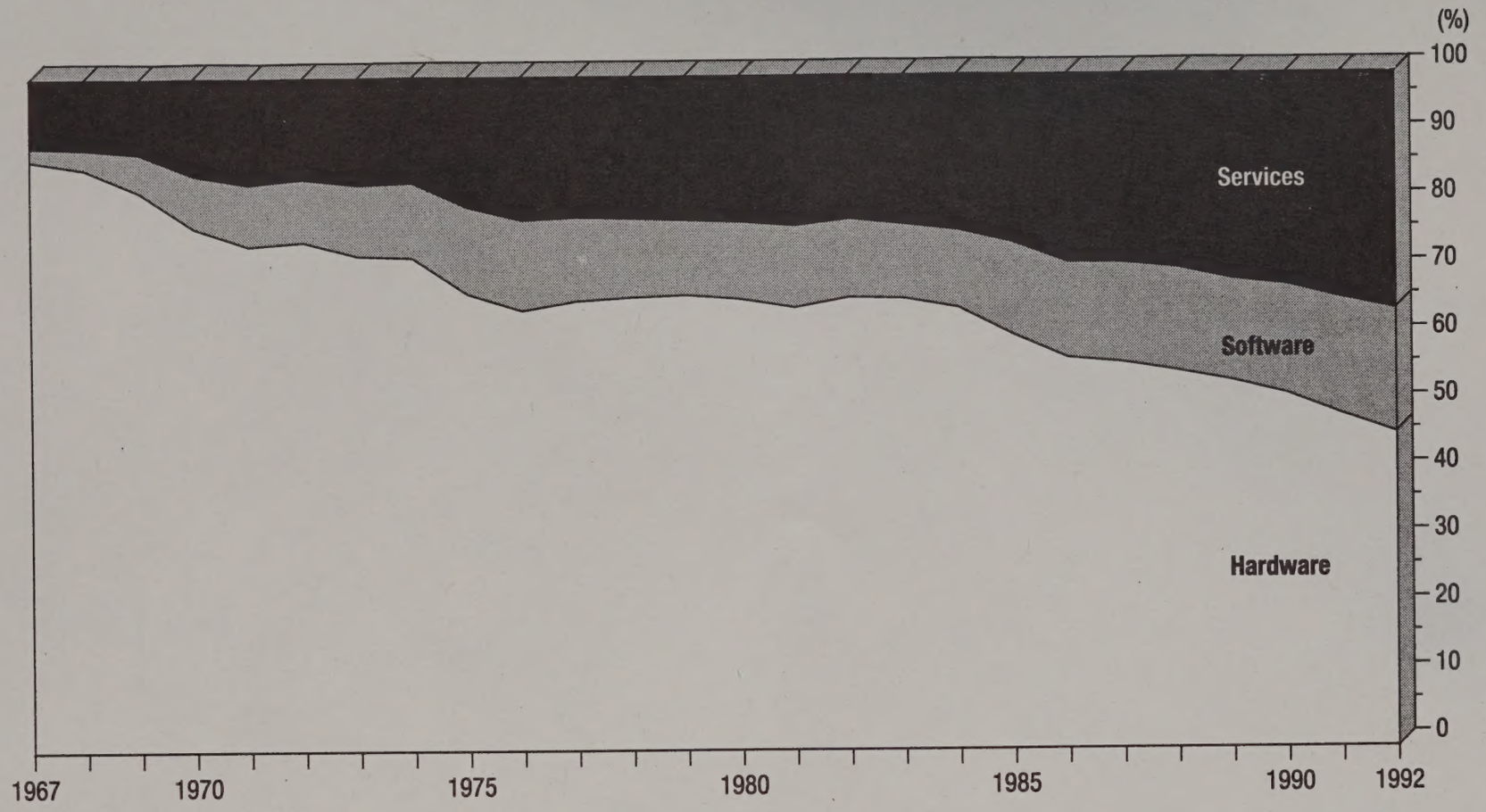
Real and Nominal Growth of the U.S. Hardware Market, 1972–1992



Source: International Data Corporation, 1993

When corrected for inflation, the U.S. hardware market has grown by a compound annual rate of only 6.8% since 1972.

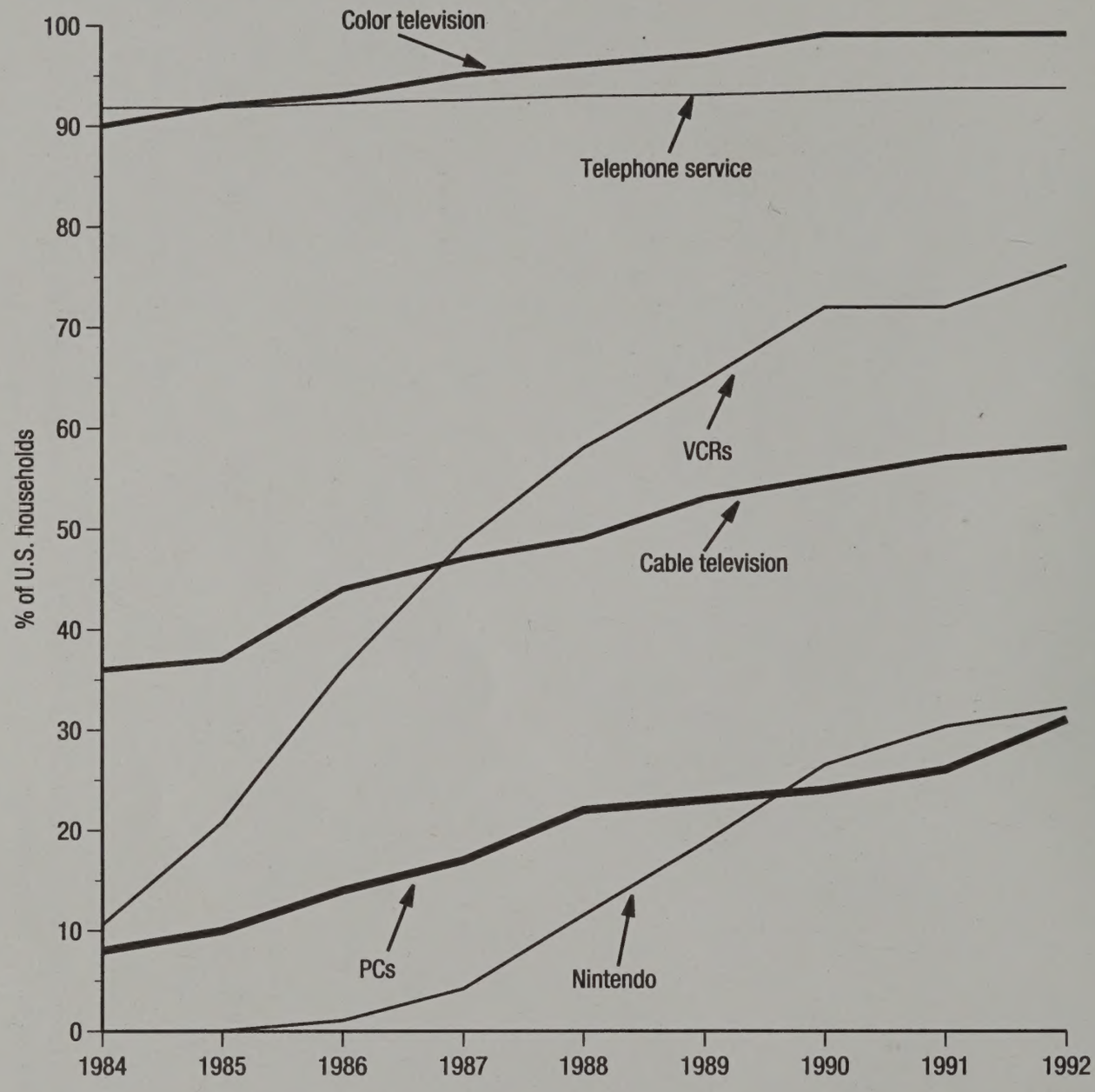
United States IT Market by Major Category, 1969–1992



Source: International Data Corporation, 1993

Spending on hardware has been a steadily declining component of the overall U.S. IT market since 1969. Software and services now account for a majority of the total market in the United States.

Penetration of Major Electronic Media in the United States, 1984–1992



Source: International Data Corporation and Statistical Abstract of the U.S., LINK Resources Corporation, 1993

PCs and Nintendo — two precursors to "interactive" media — still lag far behind traditional media penetration in the United States. Even if penetration rates grow as quickly as the VCR, neither will reach telephone/television-like ubiquity soon.

Gray Sheet Charts Available for Reproduction

IDC is selling the charts from this issue for use in presentations and reproduction. All 26 charts will be available as camera-ready hardcopy, as well as in Macintosh EPS format on a single disk, for $179. Please contact Linda Rich at (508) 935-4389 for more information.

THE GRAY SHEET
Computer Industry REPORT
MAINFRAME REVIEW AND FORECAST

DOUG McLEOD, EDITOR | September 17, 1993 | VOL. 28, NO. 22 | Published continuously since 1964.

Mainframe Staying Power and Sectoral Decline: Erosion Yes, Extinction No

Security, predictability, and manageability are counted among mainframes' most enduring operational advantages. While those features won't win many new customers or installations, distributed-computing substitutes to mainframe technology can't offer them for several years. As a result, mainframe installations have a staying power that won't entirely offset the overall malaise of the sector, but will slow its decline. At IDC's forecasted 2-4% rate of decline, the worldwide market for mainframe systems won't dip below $15 billion for several years, and may indeed level off in the not too distant future.

How do mainframe suppliers plan development and marketing budgets in an environment dominated by intense price pressure, cannibalization from lower-cost competitors, and an upgrade-only mentality? IBM has reorganized its mainframe operation (see page 8). All suppliers focus on these mainframe advantages:

- Mainframes remain the preferred platform for applications critical to managing enterprises. These centralized and database-intensive applications rely on the predictable performance and simplified network management inherent in advanced mainframe architectures. In 1992, IBM still commanded a 38% share of the worldwide database market. IBM and the PCMs are well positioned to exploit these advantages with the right solutions. IBM's forthcoming external S/390 parallel processor will be targeted at reducing costs and improving performance of complex DB/2 query. Hitachi plans to duplicate IBM's efforts, while Amdahl will ensure connections between its mainframes and the parallel processor.
- Aggressive discounting and leaner organizations mean mainframe buyers are getting more bang for the buck than ever before. IDC estimates current list prices in the $80,000/MIPS range with discounts driving these levels to $50,000/MIPS. Advances in CMOS technology will drive these prices even lower. The price per MIPS of the S/390 parallel processor, built from rackmounted ES/9221 CMOS processors, will be approximately $10,000–20,000. Organizational consolidations will continue the trend toward lower cost of

IN THIS ISSUE:

Mainframe Staying Power and Sectoral Decline: Erosion Yes, Extinction No 1
1992 Results 2
1993 Outlook 2
Profiles of Major Mainframe Hardware Suppliers 3
IBM 3
Amdahl 3
Hitachi 5
Unisys 6
Other U.S. 6
Europe 6
Japan 6
Profiles of Leading Mainframe Software Suppliers 7
Computer Associates 7
Dun & Bradstreet 7
Candle Corporation 7
Legent 7
IBM's Mainframe Problems: Institutional Dysfunction, Not Just Technology 8

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ownership for large systems. IBM and Amdahl are currently in the midst of a series of layoffs and plant closings that is far from complete. In the long run, these streamlined organizations will create cost structures that translate into lower prices (and perhaps even workable margins).

- Mainframes can provide a highly available, predictable, secure resource integrated into LAN-dominant information systems. The challenge for the large-scale-system vendors is to create a model that leverages the strengths of the large-system environment and melds with the desirable functions of the distributed environment. Although client/server offers lower costs, greater connectivity, and improved access to information and services, emerging large-scale systems contribute improved heterogeneous connectivity, lowered price/performance, and cost/megabyte reductions for storage. Further, mainframe vendors make available to users the considerable advantages of high bandwidth, data integrity, availability, systems management, and security.

1992 Results

With a few exceptions, vendors reported declining worldwide revenues for 1992. The economic uncertainty in Europe undermined an already weakened market with fourth quarter stagnation. In the aggregate, worldwide revenue fell 3% from 1991. In the United States revenues grew a modest 3.8%. IBM, Fujitsu, and Hitachi Ltd. Japan led the pack in poor performance. Amdahl, Comparex, Hitachi Data Systems (HDS), and Unisys showed signs of life and revenue growth.

The major shifts in market share showed IBM losing ground for the second year in a row, falling to 44.0% from 46.6%. IBM's lost share was in large part due to weakened U.S. sales of its DASD products (down 10-15%) and flat mainframe revenues. The apparent beneficiary was Amdahl, which saw its own share grow to 7.2% from 4.2%. Amdahl's share of the U.S. market grew by 6.0%. Amdahl's performance, particularly in the U.S. market, can be attributed to volume shipments for new system and DASD products.

Continued discounting further eroded revenues across all regions in both the storage and systems segments. IBM's 1993 mainframe announcement contained no list prices guaranteeing continued discounting and lower price structures for mainframes for the foreseeable future. Until customers and competitors master the negotiating techniques of this new pricing paradigm, price/performance levels will continue to be volatile.

1993 Outlook

The large-scale system market will decline by as much as 7% in 1993. The growth in installed MIPS peaked in 1990 and is now in decline. In 1993 MIPS growth is expected to drop below 10% for the first time. The pressures on information systems budgets and the political unpopularity within organizations to lobby for mainframe expenditures will continue to depress large-scale-system revenues. IBM will likely see its business decline further and lose market share to the PCMs. In 1993, IDC estimates that IBM's large-scale-system revenues will drop below $12 billion.

The world economy offers no tonic. The economic situation in Europe and Japan shows no signs of a quick turnaround, while U.S. economic growth remains modest. In 1993 and beyond, all mainframe vendors must ultimately cope with diminished new business growth and the gradual deterioration of its installed system base. Vendors with a diversified portfolio of platforms, such as IBM, will eventually strike a new balance. Those without can be expected to commit themselves to developing systems and technologies that satisfy customer desires for distributed solutions in an effort to hold onto site share.

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Profiles of Major Mainframe Hardware Suppliers

IBM

IBM's large-scale-system revenues will decline by approximately 10% worldwide in 1993, due to increased competition from PCMs and slow customer demand. Price cutting continues to hurt mainframe revenue.

The poor 1993 results come on the heels of a lackluster 1992. In 1992 IBM's large-scale-system revenues declined 6%, due primarily to a lack of high-end-system sales in Japan and Europe. Despite favorable European currency conversion rates, fourth quarter revenues were dismal. As much as two-thirds of IBM's water-cooled-system sales in Europe came from inventory machines as opposed to new boxes. Pricing pressures continued to plague IBM and its competitors. Customer demands for discounting drove price/performance levels below $60,000/MIPS for IBM's high-end machines.

Although the formation of AdStaR is expected to reap benefits in the long term, the company recorded a 13% decline in 1992 storage revenue due to increased competition. Direct-access storage devices (DASD) also experienced revenue declines due to price pressure from competitive products. In 1992, IBM began discounting its high-end storage products as part of its new policy of competing on total price.

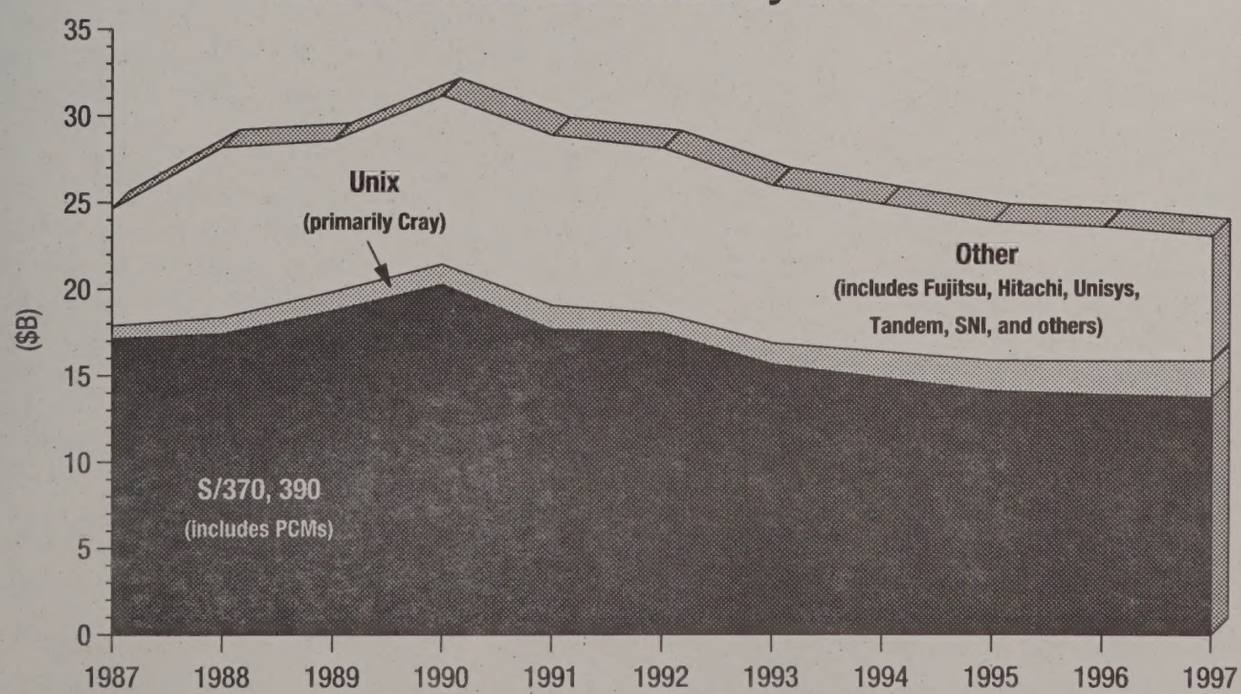
IBM made two notable adjustments in mainframe strategy in 1993. First, it announced plans to introduce options that serve specific functions for particular market segments. For example, the dedicated ES/9000 cryptography engine and its data compression facility are focused on improved storage price/performance.

In addition, IBM has initiated tactical and strategic pricing actions related to S/390 software intended to improve mainframe sales. IBM is offering a software licensing agreement based on customer usage requirements. And, it will forego annual software price increases for 1994, which typically run from 3% to 5%. The changes are designed to reduce or remove a barrier to growth into the newly announced high-end systems.

Amdahl

Amdahl's 1993 revenue will be off from 1992 levels as much as, if not more than, IBM's. Unlike IBM, Amdahl came off a strong 1992. Mainframe revenues grew a dramatic 66% worldwide. The strong

Worldwide Mainframe Revenue by Environment



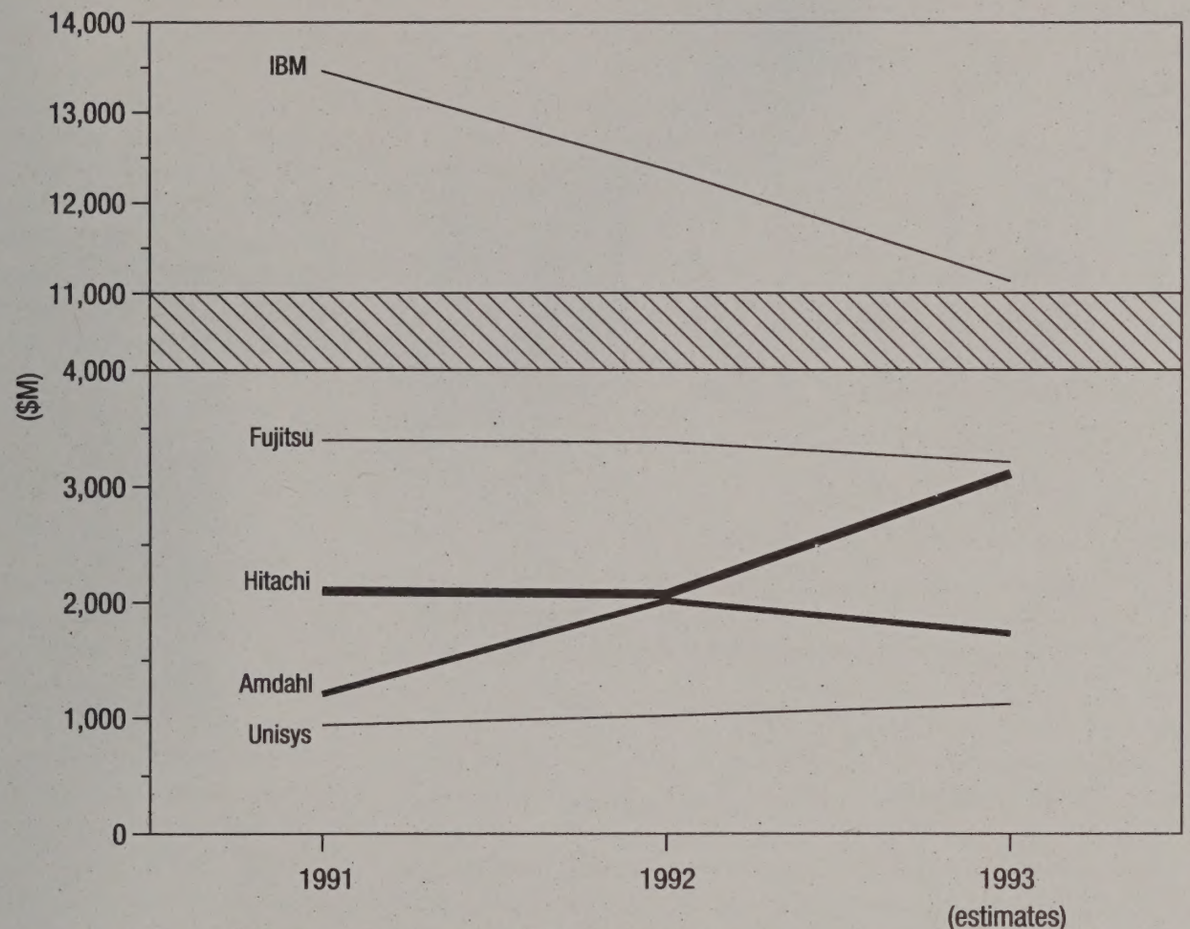
Source: International Data Corporation, 1993

Large-Scale Systems, 1987–1997

Year	Number of Systems Shipped	Growth (%)	Cumulative Number in Use	Growth (%)	$ Million Value Shipped	Growth (%)
			— UNITED STATES —			
1987	1,680	NA	11,118	NA	9,070	NA
1988	1,495	-11.0	11,705	5.3	9,360	3.2
1989	1,360	-9.0	11,279	-3.6	9,545	2.0
1990	1,114	-18.1	10,451	-7.3	9,820	2.9
1991	1,098	-1.4	10,261	-1.8	8,319	-15.3
1992	928	-15.5	9,889	-3.6	8,639	3.8
1993	875	-5.7	9,585	-3.1	8,015	-7.2
1994	860	-1.7	9,270	-3.3	7,820	-2.4
1995	855	-0.6	8,995	-3.0	7,410	-5.2
1996	850	-0.6	8,710	-3.2	7,095	-4.3
1997	830	-2.4	8,375	-3.8	7,125	0.4
	1992–97 CAGR	-2.2		-3.3		-3.8
			— INTERNATIONAL —			
1987	2,780	NA	13,202	NA	15,590	NA
1988	3,239	16.5	14,077	6.6	18,820	20.7
1989	2,882	-11.0	15,619	11.0	19,010	1.0
1990	2,421	-16.0	17,365	11.2	21,330	12.2
1991	2,246	-7.2	18,409	6.0	20,553	-3.6
1992	1,917	-14.6	17,691	-3.9	19,500	-5.1
1993	1,900	-0.9	17,540	-0.9	17,980	-7.8
1994	1,875	-1.3	17,175	-2.1	17,080	-5.0
1995	1,845	-1.6	16,765	-2.4	16,490	-3.5
1996	1,825	-1.1	16,340	-2.5	16,510	0.1
1997	1,785	-2.2	16,110	-1.4	15,945	-3.4
	1992–97 CAGR	-1.4		-1.9		-3.9
			— WORLDWIDE —			
1987	4,460	NA	24,320	NA	24,660	NA
1988	4,734	6.1	25,782	6.0	28,180	14.3
1989	4,242	-10.4	26,898	4.3	28,555	1.3
1990	3,535	-16.7	27,816	3.4	31,150	9.1
1991	3,344	-5.4	28,670	3.1	28,872	-7.3
1992	2,845	-14.9	27,580	-3.8	28,139	-2.5
1993	2,775	-2.5	27,125	-1.6	25,995	-7.6
1994	2,735	-1.4	26,445	-2.5	24,900	-4.2
1995	2,700	-1.3	25,760	-2.6	23,900	-4.0
1996	2,675	-0.9	25,050	-2.8	23,605	-1.2
1997	2,615	-2.2	24,485	-2.3	23,070	-2.3
	1992–97 CAGR	-1.7		-2.4		-3.9

Source: International Data Corporation, 1993

Mainframe Hardware Revenue* (Estimates $M) of Mainframe Suppliers, 1991–1993



** Revenue estimates include system, DASD, and peripherals.*

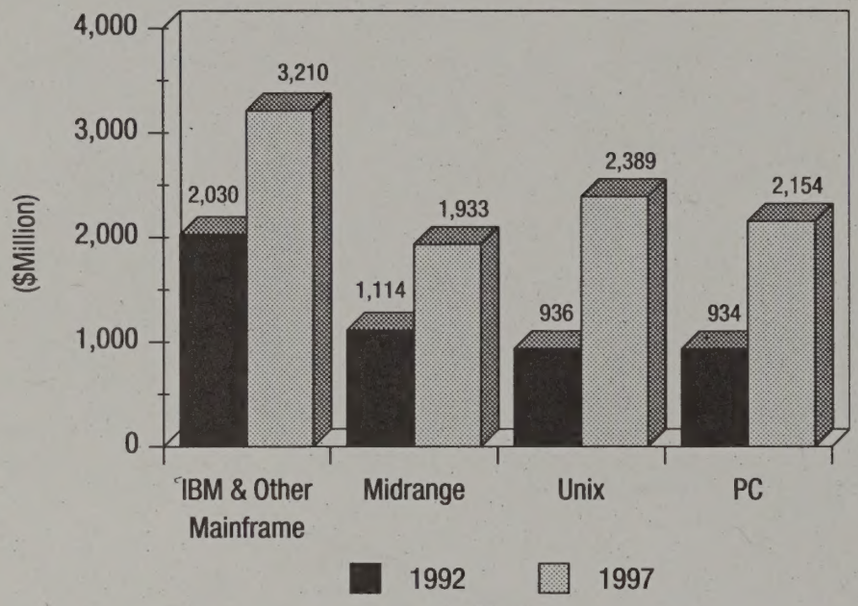
Source: International Data Corporation, 1993

1992 was due to volume shipments of the MSeries high-end mainframes and the latest technology, IBM compatible-disk subsystems. Costs associated with workforce reductions resulted in dramatic profit declines, tempering the increased revenues. IDC believes Amdahl gained as much as three percentage points in market share after losing ground the previous year due to problems with high-end disk subsystem shipments and delays in MSeries manufacturing. Although revenue growth from 1991 to 1992 is dramatic, the compound annual growth rate from 1990 to 1992 is a more moderate 6%. The operational consolidation is severe, but necessary. Moreover, Amdahl is still positioned technologically to compete for high-end business and will maintain a compatibility schedule with IBM. Using advanced design tools, PCMs have proved adept at matching IBM's functional enhancements within a reasonable time frame. The problem for Amdahl is the slow growth of the high-end ES/9000 market in which it competes best.

Hitachi

Hitachi Data Systems (HDS) continues to improve its position in both sales and technology. The vendor showed steady growth in worldwide revenues (12.0% from 1991 to 1992) and market share (0.5% increase). HDS's ability to stay focused on delivering as-advertised performance and reliability is providing a strong marketing message in competitive situations. Additionally, HDS's DASD business remains solid. IBM and Amdahl have been battling it out at the high end of the large-scale-system market, evidenced by IBM's attack on Amdahl via the Large System Performance Reference (LSPR), a detailed set of metrics that compares numerous IBM and PCM processors and calls into question Amdahl's performance claims. At the same time HDS continues to make steady progress in both revenue and market share. The vendor's commitment to delivering performance and

Worldwide Database Revenue by Platform, 1992 and 1997



DBMS development on Unix and PC platforms is growing more rapidly than DBMS development on mainframes. In 1997 mainframe DBMS will still be the largest single component of the overall DBMS market.

Source: International Data Corporation, 1993

reliability continues to provide HDS with a positive image in the large-scale systems market. The HDS Osiris initiative, which combines a version of the HIOSF/1M operating system running on an HDS mainframe with a Sun Sparcserver-based network coprocessor, enters the vendor into the open-systems arena.

Unisys

Nothing demonstrates the turnaround at Unisys better than the string of profitable quarters the company has put together. 1993 will be another strong year, after a strong 1992, which saw 9% growth worldwide over 1991. This growth is attributable to volume shipments of the revitalized 2200 and ASeries lines. The primary source of Unisys's success in the large-scale-system market is its current installed base. IDC is still cautious in pronouncing long-term growth and health for Unisys in the large-scale-system market: the company is facing the same trends (like downsizing) and barriers to growth (like reduced mainframe spending) that IBM and others continue to face. With its recent reorganization, Unisys has opted for a flattened organization built around three business groups in an effort to streamline the decision process and allow the company to more promptly react to the changing dynamics of the large-system marketplace. Chairman James Unruh will take more direct control of the firm heading up the Information Services and System Group (ISSG) himself. This group is to focus on enterprise integration. The other two groups, Government Systems (GSG) and Computer Systems (CSG), will report directly to him. After a brief retrenchment period following massive layoffs, Unisys recovered with an encouraging performance in 1992. Though it would be imprudent to claim full recovery, the future has a degree of promise absent two years ago.

Other U.S.

Digital also posted a dramatic decrease in 1992, which is primarily due to the replacement of the VAX 9000 family with the lower-priced VAX 10000. IDC classifies the 10000 as a medium-scale system. After years of continued growth, Cray finally hit the wall in 1992 with a worldwide large-scale-system revenue decline of about 8%. Tandem's 1992 large-scale-system revenue fell slightly, but Cyclone business remained relatively stable.

Europe

Comparex is showing surprising strength in 1993 while other European vendors suffer. Both Comparex and Olivetti grew their annual worldwide large-scale-system revenues in 1992, approximately 8% and 4%, respectively. In addition, each vendor improved its market position in Europe by about one point and a third of a point, respectively. These increases are not dramatic, but Groupe Bull, Siemens/Nixdorf, and ICL all posted declining worldwide large-scale-system revenues in 1992, ranging from 13% to 9% to 6%, respectively.

Japan

Japanese vendors's woes continue in 1993. Both Fujitsu and Hitachi are experiencing falling mainframe revenue. What's worse, 1992 was poor for both companies. Both fell victim to the Japanese economic slowdown and ended 1992 with declines of 1% each. Nippon Unisys and NEC also finished poorly, 1% and 17%, respectively. Beyond economics, the Japanese large-scale-system market is facing up to the realities of downsizing. The major vendors are responding with the development of downsizing defensive and offensive strategies.

Profiles of Leading Mainframe Software Suppliers

Mainframe software suppliers are moving away from the mainframe, but not abandoning it. Their current business mix includes mainframe maintenance revenues, user-based licensing policies, and new products to address distributed architectures and heterogeneous environments.

Not all software companies have managed the transition to smaller systems gracefully. Bachman Information Systems, long tied to the IBM mainframe environment (and for a time profitably so), now struggles with profitability as it tries to recast itself as a client/server tool vendor. Other mainframe software vendors like Computer Associates, Dun & Bradstreet, Candle Corporation, and Legent have diversified their business to pursue opportunities in the various growth segments of the software market.

Computer Associates

CA has been diversifying into midrange and microprocessor markets with data center products and applications. Most of CA's mainframe applications are being ported to Unix as part of the vendor's client/server strategy. The shining light of the effort is CA-Unicenter, being ported to all major Unix midrange platforms and the unifying force for managing heterogeneous environments. The vendor is also committed to integrating object-oriented technologies into management and development tools. Buoyed by continued mainframe maintenance revenues and the rapid ascent of its midrange data center products, CA enjoyed a 60% increase in second quarter 1993 revenues. Usage-based licensing fees create an equitable pricing paradigm and may also serve to extend mainframe maintenance fees. Although midrange products are the fastest-growing segment of CA's business, mainframe revenues still account for over 70% of revenue.

Dun & Bradstreet

Dun & Bradstreet (D&B) has embarked on an ambitious client/server-application migration strategy designed around core workflow-based frameworks for its accounting, financial, and human resource management application families. The SmartStream decision-support and Financial Stream client/server packages offer an integrated framework for decision support and financial applications that incorporate workflow and business process reengineering (BPR) concepts and will run on a broad range of platforms. Later to come in 1994 are packages for human resources, distribution, and manufacturing. Many pieces must fall into place for the solution to work. Already D&B is integrating technology from Microsoft, PowerSoft, Cognos, and Sybase. D&B is targeting large multinationals that may be attracted to one-stop shopping for its decision support and finance systems. No one else in the market has such an integrated solution. The next few years will be a critical transition for D&B, during which time it must keep its installed base of mainframe users satisfied and receptive to its new solutions.

Candle Corporation

Candle has moved quickly and effectively toward support for open computing and object technology. Candle is rebuilding its entire system management product line around the need to better manage and integrate diverse environments including mainframe. The Open Candle strategy aims to provide enterprisewide systems and performance management by extending its products to the AS/400, Unix, LANs, and PCs. In 1993, Candle has released a series of object-oriented AS/400 systems management products under the IBM SAA SystemView name and ported Omegamon to the AS/400, allowing mainframe management of AS/400 environments. The company remains loyal to the needs of its mainframe user base and will continue to enhance products such as its Omegamon II SMS storage management system. Candle has developed a close working relationship with IBM and, as a serious IBM International Alliance member, maintains compatibility with IBM evolving environments. As IBM products like DB2 and NetView migrate to distributed systems, Candle's products will quickly follow. Candle was also one of the first vendors to move to usage-based licensing for all of its products, replacing outmoded tiered licensing schemes. While the new policies will assuage mainframe customers, usage-based licensing will be a required element for distributed architectures.

Legent

Legent did not respond as quickly as other companies to the demands and opportunities of mixed and distributed environments. Through acquisition and product development, it has begun to change course. Legent has locked onto the fact that its downsizing customers continue to require strong systems and network management products and has subsequently committed to developing client/server systems management tools and links to the enterprise, such as a recently introduced Windows-based version of the XCom file transfer product previously only available for SNA networks. A vital product in Legent's mainframe migration is DistribuLink, an electronic software distribution (ESD) system for distributing and managing software across multiple platforms from the mainframe to the PC. DistribuLink promises to enable the central IS organization to regain control of the computing infrastructure. The planned integration with the Endevor life-cycle management product would create a software management solution from design through distribution. Legent has also joined the usage-based licensing revolution, capping transfer and annual maintenance fees and offering site licenses and enterprisewide contracts covering multiple and international locations.

IBM's Mainframe Problems: Institutional Dysfunction, Not Just Technology

Much of IBM's current situation has been attributed to the company's overreliance on mainframes. That view may not be entirely accurate. Indeed, IBM's unique mainframe expertise may present a strategic advantage as the company looks at its customers' information processing needs in the 21st century. That's why IBM recently allied its two major commercial systems businesses under John Thompson.

There are three main reasons to reorganize IBM's AS/400 and ES/9000 businesses: development, manufacturing, and marketing efficiencies. More importantly perhaps, this new alliance is a tacit acknowledgment of a new role for the mainframe at IBM.

For all the bad press that IBM's large-system products, organization, and people have been receiving over the past 18 months one might think that mainframes have been the sole drain on IBM's profitability. That's not quite true. IBM's share of the mainframe market this year will slip to somewhere under $12 billion in revenue. Even if that continues to decline over the next few years, IBM should be able to make a tidy profit on $10 billion turnover.

So, why the bad press? That's because of the view that IBM's reliance on mainframes has precluded it from participating more fully in other, faster-growing industry segments. According to this view its mainframe bias has stifled growth by effectively limiting IBM's range of solutions and by building a mainframe-centric organization that became ineffective and unresponsive to its customers.

This is largely true. But it's not the mainframe's fault. Mainframe technology looked like a good culprit. The real blame lies in a decade of IBM management that refused to recognize the limits of the technology. The institution that grew enslaved to mainframes and mainframe profits is the real problem. IBM has staggered for the last two years because of myopic management that sought to replicate the mainframe business model across the entire industry.

In retrospect, that's a troublesome proposition. One proposed solution — a deconstruction of the entire company along the lines of major product families — makes more sense but is equally difficult to pull off.

In truth, IBM really has no good choice when it comes to mainframes. It can't make mainframes the cornerstone of long-term strategy, because they're too expensive compared to commodity-microprocessor substitute technologies. It cannot afford to develop aggressive new mainframe products for a shrinking, flat-at-best, market.

Nor can IBM design and communicate a gradual exit strategy. Mainframes still make money and cover overhead. They are its most important link to its biggest customers. Such a move would be suicidal. But just because none of the options are great ones doesn't mean that IBM didn't have to make a choice. That's a recipe for failure.

With the reorganization of responsibilities, IBM's mainframe business strategy is coming clear. First, it cut costs associated with the mainframe business. That made the ES group more directly accountable to the bottom line. New management has acknowledged that mainframes might not be as universally attractive to the IBM customer base as former management had hoped. A tighter definition of the mainframe's role can only increase its effectiveness in core applications and industries.

Finally, a refreshed product strategy based on low-cost and innovative upgrades of the traditional architecture strengthen the relationship between IBM and its biggest mainframe customers. The two most prominent parts of the new product strategy have been the introduction of lower-cost CMOS technology and a parallel processor (scheduled for early next year).

Customers should be happy that IBM has returned with a less ambitious, more realistic strategy. Competitors might even feel a renewed fear that IBM will reap huge margins from a business that few of them have any hope of winning. And if similar changes occur throughout IBM's other product groups, IBM's stockholders might just end up the biggest winners of all.

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Computer Industry REPORT

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Can Today's Monopolies Be Sustained?
The Impact of Windows NT on Long-Term IT Industry Structure

In This Issue:

Can Today's Monopolies Be Sustained? The Impact of Windows NT on Long-Term IT Industry Structure 1
- *Stages of History* 1
- *Phase 3, True Dis-Integration* 2
- *Breaking Up the Triumvirate* 2
- *Central Processors, Looking Back . . .* 2
- *Worldwide PC Processor Market Share Forecast, 1990–1996* 3
- *U.S. Portable PC Processor Market Share Forecast, 1990–1997* 4
- *U.S. Notebook PC Processor Market Share Forecast, 1990–1997* 4
- *Worldwide PC Operating System Market Share, 1992–1996* 5
- *. . . And Looking Forward* 5
- *Software Is Different* 5
- *IBM's OS/2 and Microsoft's NT at Large User Sites: Advantage NT* 6
- *Worldwide PC Local Area Network Operating System Node Market Share, 1990–1997* 7
- *The End of the Virtual Monopoly* 8

Now that initial shipments of Microsoft's Windows NT have begun, it is easy to get lost in the details of the product rollout and lose focus on the larger picture. Windows NT represents far more than Microsoft's latest effort to extend its industry position. If successful, it has the potential to complete a major phase of an industry restructuring process that began with the IBM PC in 1981.

More specifically, the last decade has seen the extraordinary rise of three near monopolies for Intel, Microsoft, and Novell. The key question for the rest of the 1990s is whether these positions are sustainable. Will highly dominant de facto leaders be both the past and the future of the IT industry, or are there good reasons to believe that the open-systems movement will, in fact, lead to more open competition and egalitarian results?

Many IDC clients are by now familiar with IDC's theory of IT industry dis-integration, our description of the reasons for and implications of the shift from an industry dominated by vertically integrated system suppliers to one where the industry's most important competition takes place within each stage of the value chain.

In this memo, we will apply this analytical framework and examine the question of market dominance from a structural perspective. In particular, we will focus on Windows NT's ability to transform the IT industry from the "virtual company" model that dominates today's market toward one of truly dis-integrated competition that should emerge by the end of the decade.

Stages of History

The structure of the IT industry can be described in terms of three major phases. Phase 1 consisted of the integrated system era where companies designed and built their own integrated hardware, software, and communications architectures. This period began in the 1950s and grew largely unopposed until 1981 and the introduction of the IBM PC.

Following this scheme, the years from 1981 to 1993 can be viewed as an interim Phase 2 period. During this time, the industry began to rapidly dis-integrate. Vertically integrated companies such as IBM and

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Digital were largely superseded by what might be called a "virtually vertically integrated" industry model.

Under this model, separate companies emerged to lead at each layer of the value chain (Intel in processors, Microsoft in operating systems, Novell in networking, etc.). However, each of these layers has always been closely tied to one another. DOS ran only on Intel, and Novell primarily provided a means of networking DOS/Intel machines.

In this sense, these three companies were virtually vertically integrated in that it was difficult for a customer to have one without the others, and the success of one company tended to feed the success of the others. Indeed, were all three to have merged into a single company, it would not necessarily have led to any major change in aggregate group behavior. Each maintains the same sort of near-monopoly position that IBM enjoyed in processors, system software, and networking in the 1960s and 1970s, with comparable levels of profitability. The biggest difference is that IBM also provided extensive sales, service, and support capabilities, something the virtual company has done largely through partners.

Phase 3, True Dis-Integration

The arrival of Windows NT, the sale of USL to Novell, and recent heightened efforts to unify Unix signal that Phase 3 of this process has probably begun. During this period, the industry will make a serious attempt to become truly dis-integrated. By this we mean that the virtually vertically integrated model of today will tend to give way to an industry where each layer of the value chain is increasingly isolated from the events in other layers. During this period, the three members of the virtual company will become at best indifferent to one another and in the case of Microsoft and Novell openly hostile.

Within this structural perspective, the significance of both NT and Unix is, of course, their potential to sever the historical link between systems hardware and software. It is only when the industry is fully dis-integrated in this manner that hardware and software competition can be truly open. NT is clearly the most likely product to facilitate this separation on the desktop, while Unix still has an edge in the multiuser/server camp.

Skeptics might reply that the idea of separation is nothing new, having been talked about for at least a decade. But it is important to keep in mind that major structural changes do take time. The vertically integrated Phase 1 business model faced no opposition for more than 25 years; today's virtually vertically integrated Phase 2 model has now been around for just 12. Phase 3 should not be expected to take over quickly, and perhaps not even steadily. The scope of the changes probably won't become fully visible until the late 1990s.

Breaking Up the Triumvirate

Students of Roman history may notice some parallels, albeit inverted ones. Ancient Roman government went from a lengthy republic to a brief rule by triumvirate (twice), followed by a lengthy empire. Conversely, the computer industry can be seen as going through a lengthy empire (IBM) to a relatively brief triumvirate (Intel, Microsoft, Novell) to, most likely, an eventually lengthy republic (open, dis-integrated competition).

As Roman history suggests, triumvirates tend not to last as long as empires. Eventually, the interests of the members conflict. If Microsoft, Intel, and Novell were one company, the two software companies would do things to protect the more vulnerable position of the hardware vendor. Because three separate companies are involved, this won't happen. These conflicting interests coupled with a faster-moving overall industry suggests that the reign of the current triumvirate will be shorter than that of IBM. History and economics also strongly suggest that software monopolies are much easier to sustain than hardware ones.

Central Processors, Looking Back . . .

Of the three companies, Intel's position will be the most

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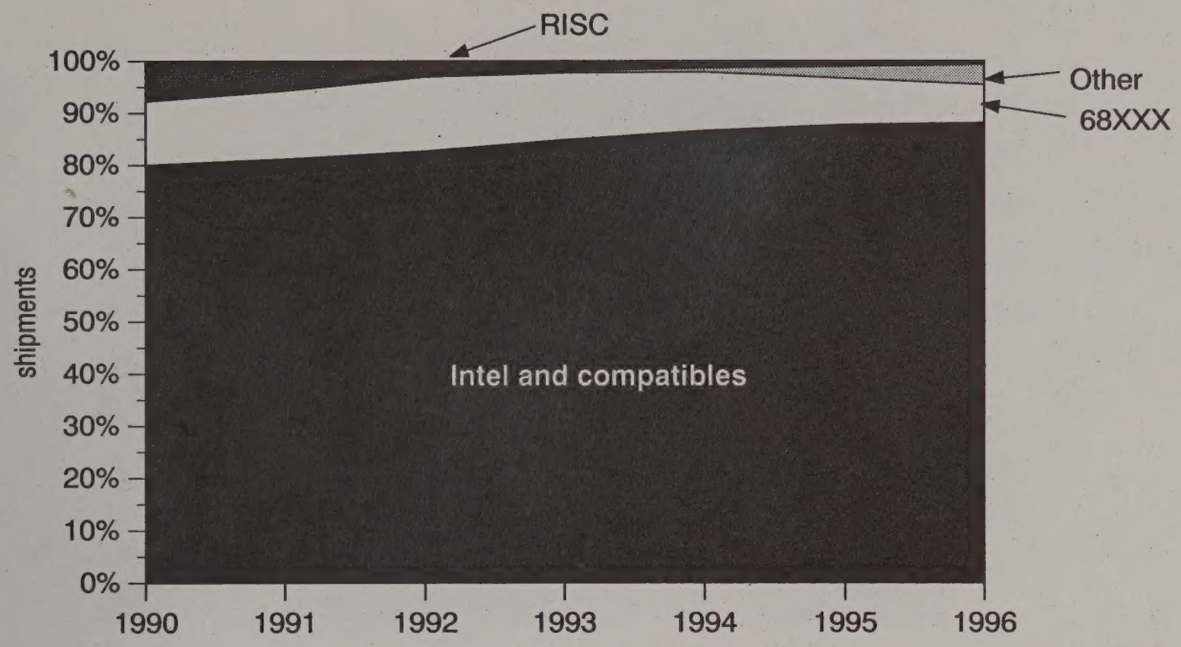
Worldwide PC Processor Market Share Forecast, 1990–1996



Note: All Intel and Intel-compatible processors are included in "Intel" above, including processors made by AMD, Cyrix, and IBM.

Source: International Data Corporation, 1993

difficult to maintain. As IBM did in mainframes, Intel faces two types of competition: from compatible devices — AMD, Cyrix, and probably others to follow — and new architectures, principally the RISC chips.

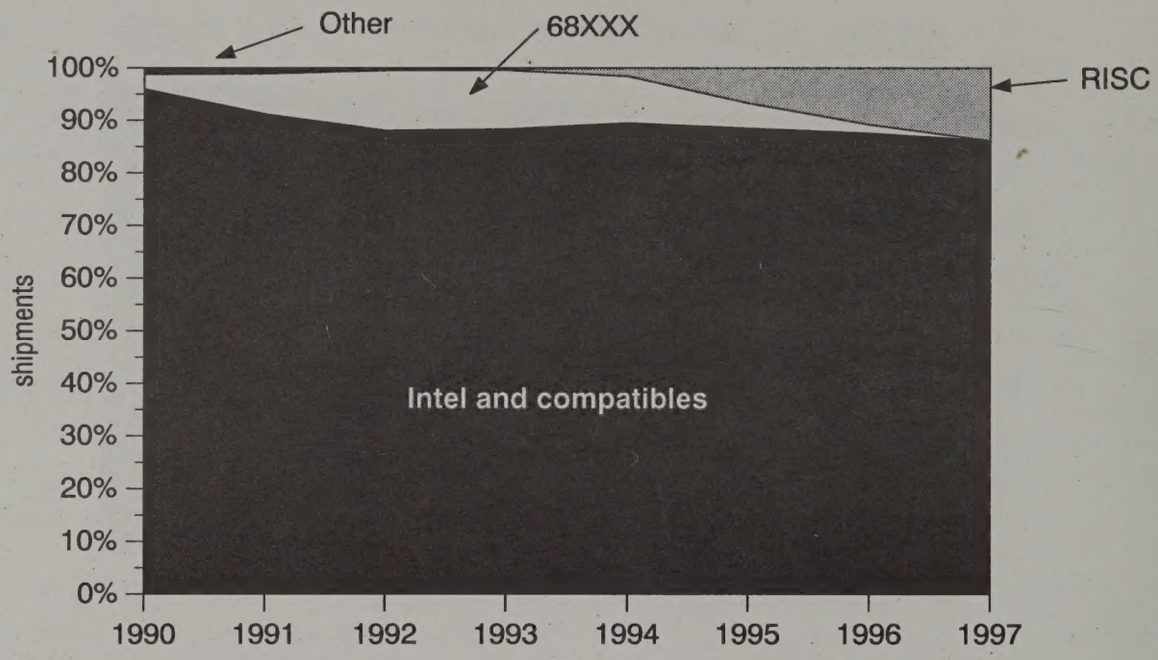
The extent of the threat from each varies with time frame. In the short term, the compatibles are far more important. Here, the history of the IBM-compatible mainframe market appears to be highly instructive. Among the lessons of this earlier era:

- High-investment, compatible processor efforts can take a long time to emerge. The first Amdahl 370 machines came out in 1975, 11 years after the 360 family was introduced. The Intel compatible market has become serious only in the last few years, about a decade after the IBM PC established the Intel position.

(Almost eerily, in both cases, money from Fujitsu seems likely to be involved. Amdahl may well have gone bust without the Japanese giant's backing. Today, Fujitsu has a 5% stake in Advanced Micro Devices. Even the names are being repeated — AMDahl, AMD.)

- Legal issues will abound, but ultimately the right to make compatible equipment in a viable and predictable manner will prevail.
- Market share increases will come in fits and starts tied to various product cycles, but the overall gains will be steady. Today, 18 years after the first 370-compatible mainframes, all of the PCMs combined have roughly half the market for IBM-compatible machines. PCM success in the Intel market is likely to come somewhat more quickly and could easily be of similar magnitude, especially if IBM aggressively enters the market or if any of the major Japanese vendors become serious PCM supporters. Both of these accelerators seem likely.
- This challenge from the compatibles will spur the market leader to accelerate its rate of product innovation, prolonging the validity of the architecture. Look what AMD's 386 chips did to accelerate Intel's 486 and even Pentium's plans, substantially closing the performance gap with many of the leading RISC chips. Similarly, it was Amdahl that pushed IBM to improve its S/370 machines in a way that made it very difficult for the old BUNCH mainframers to keep up.
- Long term, the biggest threat to the existing architecture will not come from the PCMs, whose threat can be managed, but from new technologies, which have inherent advantages over the old. Windows NT, Unix, or

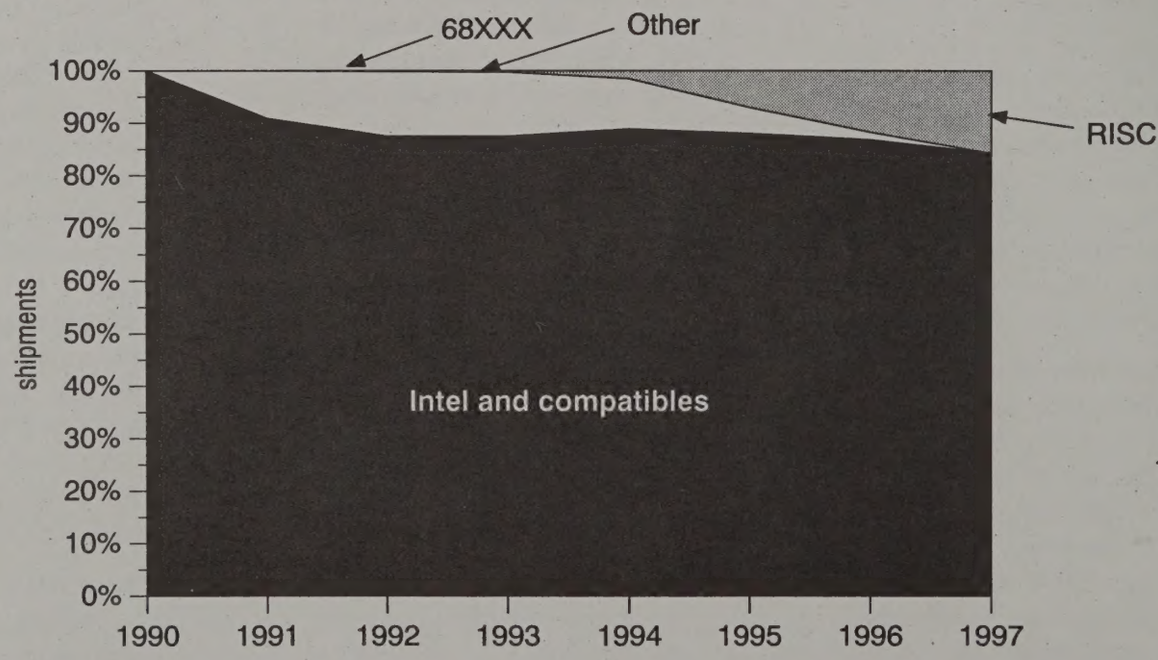
U.S. Portable PC Processor Market Share Forecast, 1990–1997



Note: All Intel and Intel-compatible processors are included in "Intel" above, including processors made by AMD, Cyrix, and IBM. Includes all portable PC segments: notebooks, smaller notebooks, battery laptops, and AC-portables.

Source: International Data Corporation, 1993

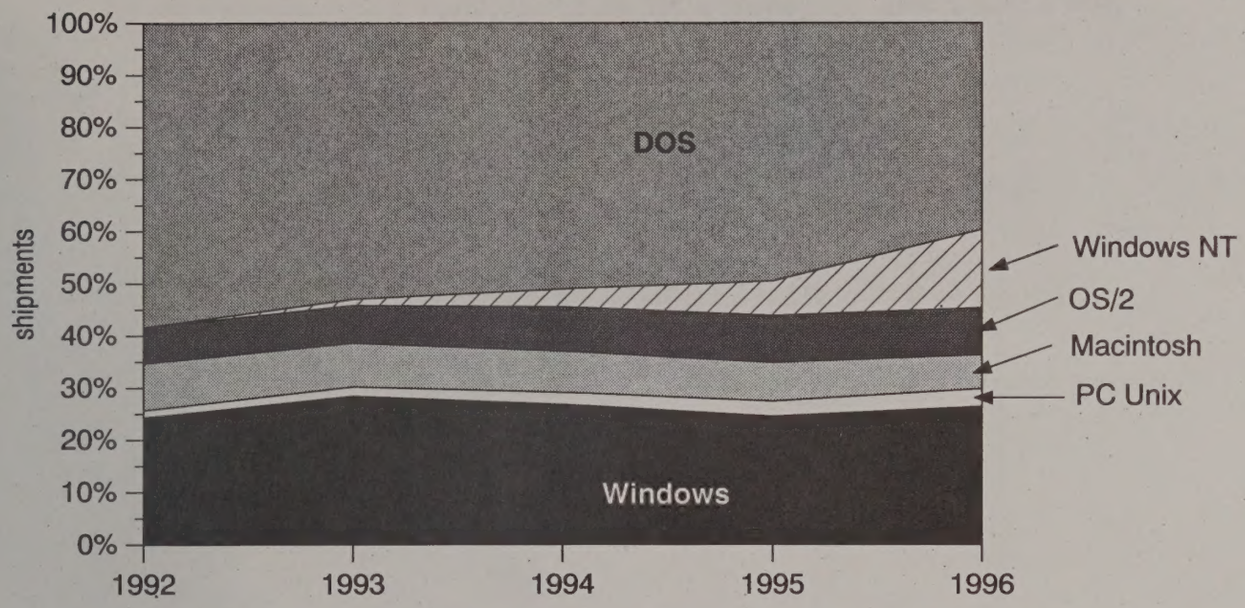
U.S. Notebook PC Processor Market Share Forecast, 1990–1997



Note: All Intel and Intel-compatible processors are included in "Intel" above, including processors made by AMD, Cyrix, and IBM. Includes only notebook PCs.

Source: International Data Corporation, 1993

Worldwide PC Operating System Market Share, 1992–1996



Source: International Data Corporation, 1993

Microsoft's DOS will lose operating system market share over the next three years. IBM's OS/2 and varieties of PC Unix will each make small increases in worldwide market share.

some other hardware-independent system software equivalent will be required for this challenge to emerge.

. . . And Looking Forward

Should any of these alternative microprocessor designs catch on, an important re-integration of the microprocessor and PC businesses would become much more likely. Stated simply, if the hardware and software architectures can be completely separated, then there is much less (perhaps no) need for the separation of the microprocessor and computer system businesses. It would not be surprising if 10 years from now Intel had to aggressively compete in the PC business to assure a market for its microprocessors. Conversely, it would be surprising if 10 years from today PC vendors were still primarily assemblers of other people's components.

Though perhaps a bit overused, the automobile analogy is still relevant. Car makers can design their own engines because the characteristics of the engine do not materially affect the driving of the car. From a very-long-term IT industry perspective, it will prove much more natural for system vendors to make their own processors than for most software to be tied to any single processing engine.

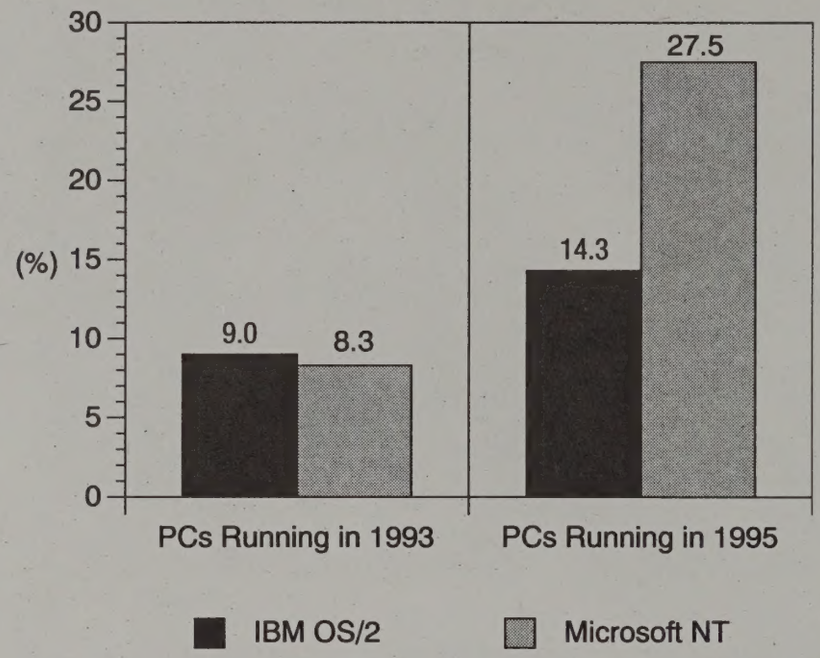
Software Is Different

Whereas the historical evidence suggests that hardware dominance tends to erode over time, software dominance, particularly in operating systems, has shown impressive staying power. Consider that:

- Despite several attempts, no operating system, S/370, DOS, VMS, etc., has ever been successfully cloned and marketed. Because software is so close to the user, there seems to be considerable psychic as well as technical, business, and legal barriers to software clones. Successful DOS-, Windows-, NT-, or Novell-compatible software remains unlikely.
- Unlike hardware, software products have virtually unlimited economies of scale (see *IT Dis-Integration Revisited: Implications for 1993 and Beyond*, IDC #7470, March 1993). This gives the market leader significant advantages in pricing flexibility, an option that should prove to be a major advantage for NT as it moves up into the Unix and multiuser world.
- Issues of backward compatibility seem to cause even more constraints for software than they do with hardware, making it very difficult for new software architectures to take advantage of existing application inventories.

Thus, the software dominance of Microsoft and Novell should show considerable resilience. Since

IBM's OS/2 and Microsoft's NT at Large User Sites: Advantage NT



Source: International Data Corporation

The prospects for Microsoft and NT appear much brighter at large volume PC sites. By 1995 27% of large PC users (see note) expect to be running NT.

NOTE: This information is excerpted from IDC's NT Survey for PC Volume Buyers. For this survey respondents were selected on an "nth" name basis from a data base of user sites in the United States. The target audience for this survey included:

- The person in a position to speak about future personal computer purchases. The sample was split about 50-50 between MIS personnel and PC managers/end-user support personnel.
- Companies with 100 or more PCs per site — the average was over 4,000 PCs per site.
- Companies with 5,000 or more employees — the average number of employees per site was 19,610.

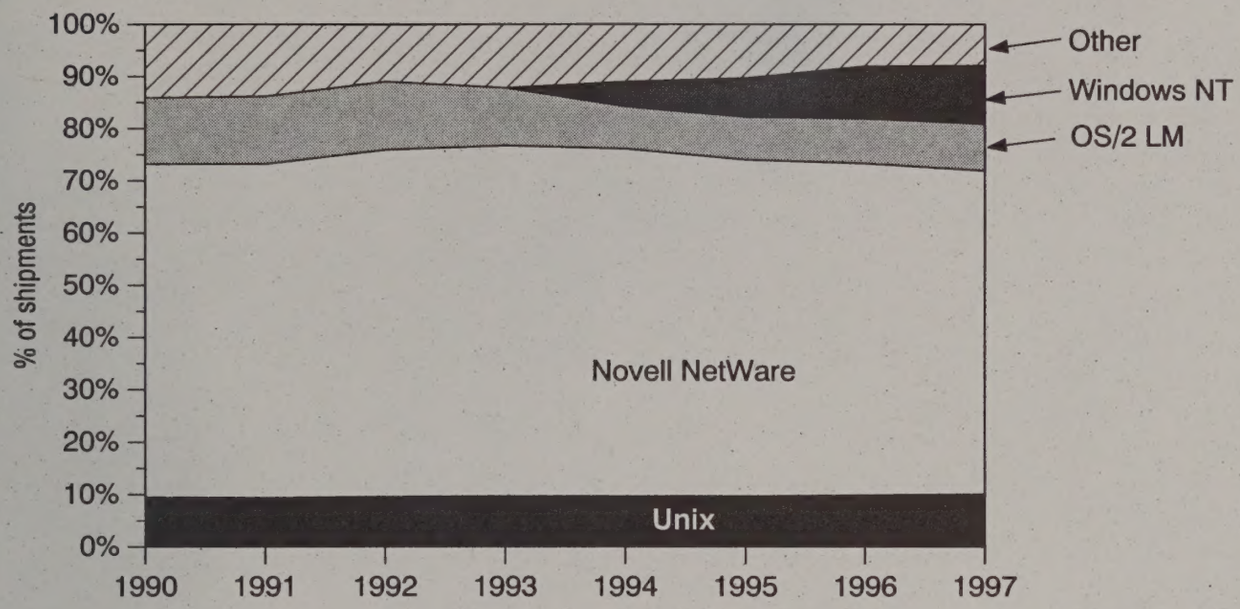
they are unlikely to be unseated by clones, their position can be challenged only by new competitive products. Since these new competitors will find it difficult to take advantage of the existing installed base, they will have to offer dramatic product improvements. Such breakthroughs are much more common in hardware than they are in software.

The history of the industry suggests that the vendor controlling the operating system will likely also control the major tools and utilities (witness IMS, DB2, CICS, Rdb, etc.). However, operating system control does not necessarily lead to application dominance. Microsoft may or may not have taken unfair advantage of its operating system position to boost its application business, but the fact remains that control over an operating system has never in the past given any company the ability to dominate in applications.

Indeed, managing near-monopoly and competitive businesses under the same roof can be tricky. While competitors fear that profits and technology on the monopoly side effectively subsidize the competitive part of the business, the process can work the other way. Below are two (albeit still remote) possibilities that could turn Microsoft's great strength into an eventual weakness.

Consider a scenario where Microsoft goes through either an extended period of miscues in its application business, or (more likely) that the applications software business model radically changes. If these segments began to lose money, Microsoft would have nearly irresistible pressure to try to squeeze more money out of its monopoly operating systems/tools side as IBM has done in mainframes

Worldwide PC Local Area Network Operating System Node Market Share, 1990–1997



Source: International Data Corporation, 1993

for years. These profits can become addictive, leading to steady increases in the cost of the overall Microsoft environment. This combined with a strong competitor (perhaps a Taligent) with a major advance in technology (perhaps objects) is one scenario that could lead to a major operating system migration.

Windows monomania is another possible path to trouble. Just as IBM tried to make its monopoly S/370 software fit every size of platform (remember the XT/370 PC and, of course, the 9370 mini) Microsoft wants to make Windows the foundation of all sorts of devices and services — handhelds, copiers, faxes, workgroups, servers, and even household appliances. These efforts appear to make considerable sense, but then again so did many of IBM's S/370 expansion efforts, which now seem almost laughable. History suggests that this pattern of one-size-fits-all behavior can have a tendency to blind a company to other, perhaps better-suited, technologies. This could lead to missed opportunities and long-term stagnation; it should be watched carefully.

In this light, the less ambitious nonapplication focus of Novell is not only less controversial, it is also less risky. Indeed, this difference in approach is a reasonable way of defining the upcoming battle between the two software giants. Without strong group applications, Microsoft would find it difficult to come up with good reasons for customers to defect from Novell; with them it could make some significant gains.

Novell's ability to unseat Microsoft is obviously much more remote. Unix on the desktop is probably more likely than the widespread acceptance of DR-DOS, but both are long shots at this point in time. On the other hand, the potential for Novell to move upwards into more sophisticated networking is largely unbounded. Novell's move upwards will be an important test of how much of the industry's product spectrum will eventually fall under the standards domain.

Thus, the most likely result is a continued strong system-software position for at least one vendor and probably both vendors for at least the rest of the 1990s. This is neither a good nor a bad thing for the IT industry. Since the software business has been largely unable to generate meaningful de jure standards, perhaps clear, stable de facto systems software standards are the best available alternative at this stage of the industry's evolution. The challenge for Microsoft and Novell is to find a balance between expanding and preserving their good fortune; the challenge for their competitors is to make sure the giants' dominance is as narrow and brief as possible.

The End of the Virtual Monopoly

For the last 12 years the fortunes of Intel, Microsoft, and Novell have been largely intertwined. What was good for one was good for the others. Looking forward it appears that this is unlikely to remain the case.

Consider Microsoft's Windows NT. Should NT become a runaway hit in the marketplace it would clearly be good — perhaps even critical — for Microsoft. But for perhaps the first time, the success of a Microsoft systems-level product would probably not be good for either Intel or Novell.

Most likely, in fact, NT's success would be a long-term negative for Intel. It would provide a critical mass of opportunity for other processor designs that can run NT. Already, Digital and Microsoft have collaborated on one threat to Intel: NT on Alpha. And NT might also be ported to several other hardware designs. Any success these other hardware platforms might enjoy would almost definitely come at Intel's expense.

In addition, NT's success would in the long term undermine the current DOS/Windows environment. The thousands of applications in this environment will remain tied to the Intel architecture. They remain a key asset for Intel. So, maintaining the strength of the current DOS/Windows environment is clearly in Intel's long term interests.

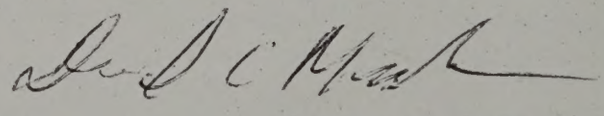
However, even in this most favorable of markets for Intel there lies some potential for increased competition and long-term market share decline. A healthy Intel-compatible market will increase the scope and competitiveness of Intel-compatible offerings. Intel X86 alternatives from AMD, TI, and Cyrix are already making inroads in these markets. This is obviously not good for Intel.

A similar, if more obvious, situation exists for Novell. It sees DOS/Windows as an asset, but NT a threat. A significant portion of NT's success will draw directly from NetWare sales.

Thus, in the long term both Novell and Intel might be better off if NT is not a major success. If NT is not a great success in the marketplace, both Intel and Novell would be more able to continue to perpetuate their current strategies. Ten years of those strategies have resulted in 85% (Intel) and 65% (Novell) market shares. It seems unlikely that either Intel or Novell could replicate such success stories very easily with new business models, in an entirely new business climate.

On the other hand, the interests of Intel and Novell are also beginning to diverge. Should Novell's Processor Independent NetWare (PIN) succeed, it would increase the opportunity for non-Intel alternatives on Novell Networks.

It is in this sense that NT signals the end of the virtually vertically integrated company, and this particular phase of IT industry history. The interests of the triumvirate are no longer in synch. In the end it may take a monopoly to break a monopoly.



David C. Moschella

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What Do Top Executives Think About Computers?
Results from IDC's 1993 Global IT Survey

IN THIS ISSUE

What Do Top Executives Think About Computers? — Results from IDC's 1993 Global IT Survey 1
Organization's Primary IT Supplier from Top Executive's Perspective 3
Top Executive's Overall Satisfaction with Primary IT Provider 3
Role of MIS Group in Overall IT Decision Making 4
Expected Change in MIS Influence in Overall IT Decision Making 4
Conclusions 4
Research Methodology 4
Overall Assessment of Organizational Impact of IT 5
Compaq: The Real Fight Begins 5
1993 Shipments by Quarter (forecast) .. 6
Management and Image Flaws 7
Dell Sales Channels, 1992 7
Compaq Sales Channels, 1992 7
Can Dell Adapt to the Japanese Market? 8

Top executives have always been an important part of the IT buying process. Back in the mainframe era, the high cost of each machine made executive involvement a prerequisite, and IBM's boardroom effectiveness was legendary. Today, a broad array of issues continues to require ongoing upper management attention.

In addition to long-standing efforts to control costs, measure return-on-investment, and sort out decision-making authority and responsibility, many executives are looking to IT as a source of significant and sustainable competitive advantage.

But what do top executives really think about the use of information technology in their organizations? To find out, IDC recently surveyed more than 500 top executives in the United States, Japan, Germany, France, Italy, and the United Kingdom. This bulletin presents some of the key findings of this research. Among the highlights:

- Despite all of its current problems, IBM still retains high mindshare with CEOs, with fully 40% naming IBM as their primary IT supplier, more than eight times the number of any other vendor mentions.
- Vendor satisfaction levels vary widely. Only about 10% of the respondents characterize themselves as "very satisfied," but nearly 80% believe that computers have made significant contributions to their organizations.
- MIS is still being asked to carry a good portion of the load. Nearly 70% believe that MIS is either a "primary" or "major" influence on IT decision making. Perhaps more of a surprise, this influence appears to be increasing. Only 12% of the respondents report that overall MIS influence is declining in their organization.
- Country patterns differ sharply. The position of MIS is much stronger in the United States and Japan than it is in most of Western Europe.

The following pages provide tables that detail each of the points above.

Some 80% of the respondents felt that they had a primary vendor, and of those roughly half named IBM. Interestingly, the other half also generally chose to name a mainframe hardware vendor. Note the pres-

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ence of Bull, SNI, ICL, Fujitsu, NEC, and Hitachi in their respective countries.

Despite all the talk about outsourcing and professional services, the number of mentions for these firms was quite low and highly fragmented. Similarly, virtually none of the executives named Intel, Microsoft, or Novell, no doubt reflecting the decision of these vendors to provide their products and services primarily through partners.

Given IBM's lagging fortunes, IDC would expect that the concept of "primary IT vendor" will in the short term continue to diminish in importance. Long term, however, we would expect that services and systems integration firms would grow to fill at least some of the void.

Top management satisfaction with their primary vendor varies significantly. Whereas roughly 10% of the sample base indicated that they are "very satisfied," there are considerable bases of discontent. Contrast the consistently positive responses in Germany and the United Kingdom with the high levels of dissatisfaction in France and Japan.

The Japanese results are particularly interesting. In Japan, there is still a relatively high reliance on proprietary vendor multiuser offerings, and consequently relatively low use of modern platforms and approaches such as PCs, Unix, LANs, and packaged software. For the last few years, anecdotal evidence has suggested that Japanese users are becoming increasingly disenchanted with these traditional vendor approaches. The survey results appear to strongly reinforce our view that a major shift in Japanese market buying patterns is increasingly likely.

Some 90% of the executives in the sample reported that their organization has some sort of centralized MIS function. (Remember that executives had to be from companies with at least $100 million in annual revenues to qualify for the sample.) Of this 90%, some 70% felt that MIS was either a "primary" or "major" influence in their organization.

Perhaps more surprisingly, top management — especially in the United States and Japan — believes that this already strong position is in fact increasing. Just 12% of the overall sample saw the role of MIS as decreasing in their organization. This influence extended deep into end-user computing and LAN environments.

The differences between Europe — particularly Germany, France, and the United Kingdom — and the United States and Japan are striking. In the three European countries the results are slightly negative, whereas in the United States and Japan they are overwhelmingly positive.

This difference is one of many between the United States and Europe, and most likely reflects the existence of somewhat smaller European firms and the heavier use of professional services companies. It also tends to reinforce a long-term industry stereotype that portrays the European customer as more focused on solutions than their technology-oriented U.S. counterparts.

However, even in the United States and Japan MIS should not rest on its laurels. Top executives are very aware of data center, network, and in particular software development outsourcing. The data suggests that executives believe there is nothing contradictory about maintaining a strong centralized information management organization at the same time that certain functions are aggressively outsourced. IDC would concur. The task of the modern IS organization is to stay ahead of this curve and to advocate the outsourcing of any functions more effectively handled by an external organization.

Top executives' bottom line evaluation of IT is generally positive. An impressive one-third of the respondents believe that IT has already proven to be a significant source of competitive advantage for their firm. (Note the extremely high 60% figure in Japan.) Only 4% admitted to a sense of overall disappointment.

Nearly 80% of the responses can be seen as positive (response 1 or 2), a figure that is consistent across countries with the notable

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Organization's Primary IT Supplier from Top Executive's Perspective (%)

Vendor	U.S.	Japan	W. Europe	Germany	France	U.K.	Italy	Total
IBM	45.0	32.0	41.3	43.0	40.7	28.6	53.4	41.4
Digital	5.0	–	7.8	10.0	11.1	4.1	2.9	4.7
Bull/Unisys	3.0	–	9.3	–	23.1	4.1	8.7	4.1
HP	–	–	3.0	–	7.4	2.0	1.9	0.8
SNI	–	–	5.7	18.0	–	–	–	1.5
Olivetti	–	–	0.5	–	–	–	2.9	0.1
Fujitsu	–	24.0	–	–	–	–	–	4.9
NEC	–	10.0	–	–	–	–	–	2.0
Hitachi	–	8.0	–	–	–	–	–	1.6
ICL	–	–	1.2	–	–	6.1	–	0.3
Other	20.0	8.0	13.9	10.0	17.6	6.1	22.3	15.9
In-house	–	5.0	–	–	–	–	–	1.0
No primary	26.0	13.0	16.8	18.0	–	49.0	7.8	20.9
Don't know	1.0	–	0.3	1.0	–	–	–	0.6
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total sites	100	100	361	100	108	49	103	561

Source: IDC's 1993 Global IT Survey

Top Executive's Overall Satisfaction with Primary IT Provider (%)

	U.S.	Japan	W. Europe	Germany	France	U.K.	Italy	Total
Very satisfied	11.0	–	10.8	15.3	9.8	7.8	9.0	8.7
Satisfied	39.0	19.0	35.1	51.8	12.0	47.1	29.0	33.9
Somewhat satisfied	34.0	30.0	30.4	29.4	18.5	35.3	43.0	32.3
Somewhat dissatisfied	4.0	34.0	8.2	2.4	16.3	2.0	13.0	11.3
Dissatisfied	5.0	12.0	5.9	–	20.7	–	1.0	6.7
Very dissatisfied	1.0	3.0	3.7	–	12.0	–	2.0	2.1
Don't know	6.0	2.0	5.7	1.2	10.9	7.8	3.0	5.1
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total sites	100	100	328	85	92	51	100	528

Source: IDC's 1993 Global IT Survey

Role of MIS Group in Overall IT Decision Making (%)

	U.S.	Japan	W. Europe	Germany	France	U.K.	Italy	Total
Primary influencer	26.2	23.4	25.5	34.3	24.7	14.3	21.3	25.4
Major influencer	47.6	37.2	37.8	30.3	24.7	54.8	52.1	42.7
One of many	26.2	30.9	30.9	32.3	34.6	28.6	25.5	28.5
Insignificant influencer	–	8.5	4.9	3.0	12.3	2.4	1.1	3.2
Don't know	–	–	0.9	–	3.7	–	–	0.3
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total sites	84	94	316	99	81	42	94	494

Source: IDC's 1993 Global IT Survey

Expected Change in MIS Influence in Overall IT Decision Making (%)

	U.S.	Japan	W. Europe	Germany	France	U.K.	Italy	Total
Increasing	50.0	69.1	31.5	21.2	27.6	28.6	58.5	49.3
Decreasing	9.5	7.4	21.0	16.2	30.3	33.3	6.4	12.1
Not changing	39.3	19.1	44.0	62.6	27.6	38.1	35.1	36.1
Don't know	1.2	4.3	3.5	–	14.5	–	–	2.5
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total sites	84	94	311	99	76	42	94	489

Source: IDC's 1993 Global IT Survey

exception of France, where the two negative responses total 40%. IDC will be repeating these questions in its 1994 global surveys, and it will be interesting to see if these high negatives in France remain.

Conclusions

On balance, the results of our executive surveys produce a positive picture. Top management is attracted to the benefits of IT and will continue to invest in it. Information technology is considered important, and executives believe that they are quite familiar with the major issues involved.

At the same time, upper management is only moderately satisfied with individual vendors, and it is clear that no vendor has emerged to even begin to fill the void left by the diminished status of IBM.

In this environment, it is not surprising that top management would continue to look to its own in-house staff for guidance. The task of building an integrated enterprise is more often than not still assigned to internal resources. However, the activities of this internal organization are subject to close scrutiny. The decision on whether to outsource certain functions is very much within the top executive's domain.

If the overall position of MIS is going to weaken substantially, all evidence suggests that the decline will emerge in Europe first, a warning to those who base their worldwide strategies primarily around trends in the United States.

Research Methodology

In January and February of 1993, IDC conducted 100 telephone interviews with top executives in the United States, Japan, Germany, France, and Italy, as well as an additional 50 interviews in the United Kingdom, for a total of some 550 responses. To qualify, respondents were required to have titles of CEO, CFO, COO, president, managing director, or the equivalent. They also were required to be from firms with a minimum of $100 million in worldwide revenue. Each interview consisted of 10 questions.

Overall Assessment of Organizational Impact of IT (%)

	U.S.	Japan	W. Europe	Germany	France	U.K.	Italy	Total
Significant source of competitive advantage	24.0	59.0	28.5	25.0	26.5	25.5	41.0	32.3
Steady contributor to ongoing operational capability	55.0	28.0	44.0	49.0	21.4	58.8	52.0	46.6
Mixed record with IT investments	15.0	13.0	19.9	25.0	26.5	15.7	6.0	15.9
Generally disappointed with ROI	5.0	–	4.5	1.0	14.3	–	1.0	3.8
Don't know	1.0	–	3.1	–	11.2	–	–	1.3
Total %	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total sites	100	100	349	100	98	51	100	549

Survey question: Which of the following four statements best describes the overall impact of information technology on your organization?

1. IT has been a significant source of competitive advantage for us.
2. IT has been a steady contributor to our ongoing operational capability.
3. We have had a mixed record with our IT investments.
4. We have generally been disappointed with the return on our IT investments.

Source: IDC's 1993 Global IT Survey

Compaq: The Real Fight Begins

After a much-ballyhooed entry into the Japanese market at the end of last year, it's now show time for Compaq.

Whether it can make it in the Japanese market in the long run revolves fundamentally around four factors: (1) the quality of its distributors/resellers, (2) the number of ever-present-yet-not-readily-visible Japanese market barriers it can blast through successfully, (3) the quality of the product (including service), (4) its image vis-a-vis IBM Japan.

The first item, which is linked to item two in some cases, appears to be one of Compaq's biggest problems. At this stage Compaq's resellers and distributors, with the exception of a few, rate from fair to poor, with the majority falling into the latter category.

The problem: Most dealers know little about the Compaq product and thereby have a fuzzy idea at best as to why a Compaq might be the superior machine to offer customers. Moreover, it appears that Compaq is doing a poor job of explaining to resellers and distributors what the advantages of the Compaq line are.

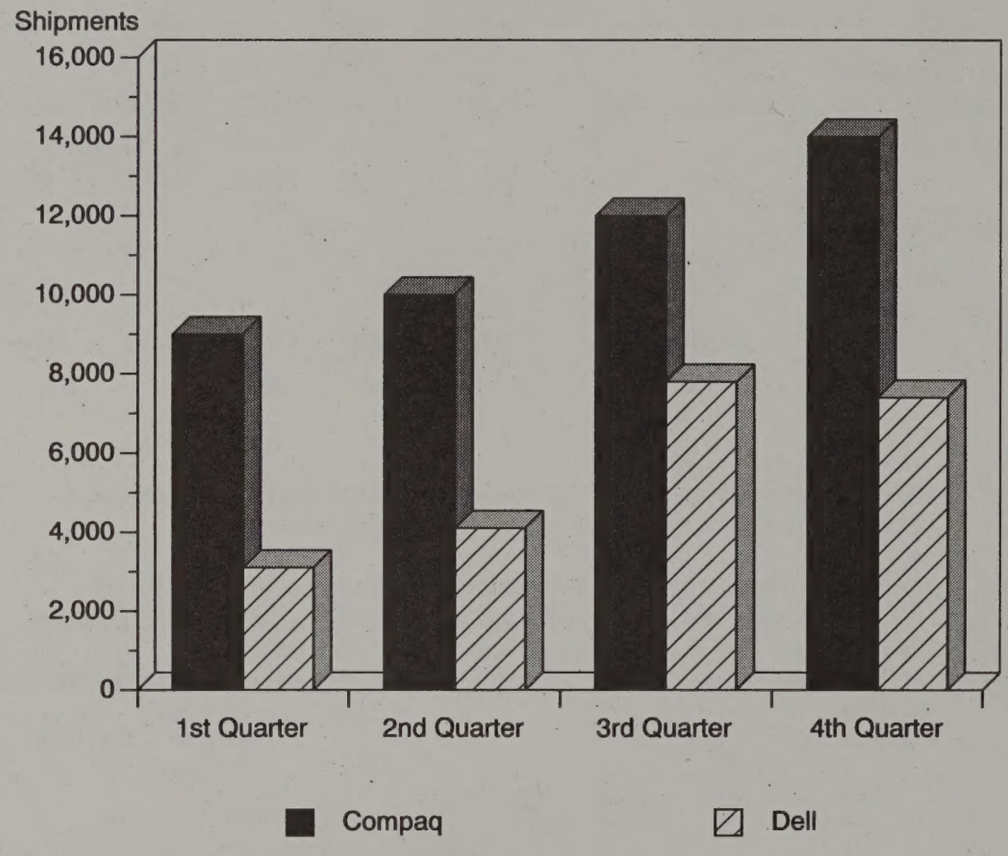
This problem is exacerbated by NEC-dominated distributor/retail channels (item two) that leave little opportunity for Compaq to bolster its marketing clout. This is an important point since resellers and distributors in Japan are extremely loyal to the large Japanese national-brand companies like NEC and Fujitsu.

This differs from the United States where most distributors and resellers — particularly direct marketing channels — freely handle brands from U.S., Japanese, and Taiwanese companies based on business decisions, not necessarily because they feel obligated to maintain long-standing fraternal relationships with native companies.

Along these lines, the following reseller case reflects problems that Compaq faces nationwide:

One of Compaq's largest retailers in the Tokyo metropolitan area has traditionally sold NEC machines and maintains a close relationship with NEC. This reseller's sizable sales force is

1993 Shipments by Quarter (forecast)



Compaq, Dell shipments are becoming more than just specks on the Japanese PC market map.

Source: IDC Japan, 1993

trained exclusively by NEC, starting from the basics of what a personal computer is, all the way to how to use popular applications like Lotus 1-2-3. In short, NEC foots the bill for molding this store's sales force and in turn exerts no small amount of influence on what machines these salespeople will sell. It is in this kind of environment that Compaq is trying to sell many of its products.

But this is only half the problem for Compaq in the reseller channel. The other half falls squarely on Compaq. Its machines are difficult to find in stores in Akihabara — the electronics Mecca of Tokyo — and in stores that have them, prominence is limited. Furthermore, even sales staff in non-NEC shops have little knowledge of Compaq PCs. These resellers, moreover, appear to get little if any training from Compaq. Rather, they are usually focused on selling IBM personal computers and are much more in tune with the intricacies of these machines.

On the distributor side, Compaq's problems are similar. Large, traditional national-brand distributors have little interest in selling Compaq machines at this stage. Some of the reasons are valid, some of them not.

One major distributor asserts that it doesn't sell Compaqs aggressively because customers don't want them — a valid point in many cases. But in other cases, reasons run deeper than this. Distributors are often beholden to NEC or Fujitsu, and major efforts to sell Compaqs would obviously do damage to these time-honored relationships.

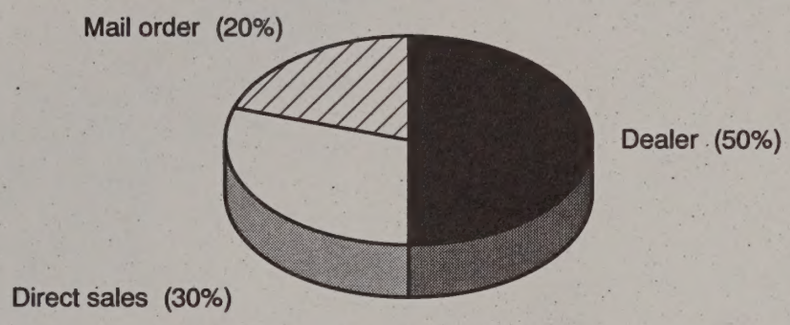
On the other hand, Compaq is not making clear the merits of the Compaq brand to the distribu-

tor channel. This gives a ready excuse for NEC dealers to relegate Compaqs to the bottom of their sales priority lists. Compaq's Japanese management claims it is now trying to turn this situation around by working directly with major dealers to link Compaq high-end server PCs with sales of Novell NetWare at these dealers. But this still doesn't resolve one major problem: Novell NetWare is not anywhere near the roaring success in Japan that it is in the United States.

But not all the news is bad. Softbank, one of the largest PC software vendors in Japan and relatively independent, says it will now begin to sell Compaqs. If Compaq plays its cards right here, this could be a substantial boon since Softbank, in its alternative role as a major system integrator, could move a lot of Compaqs.

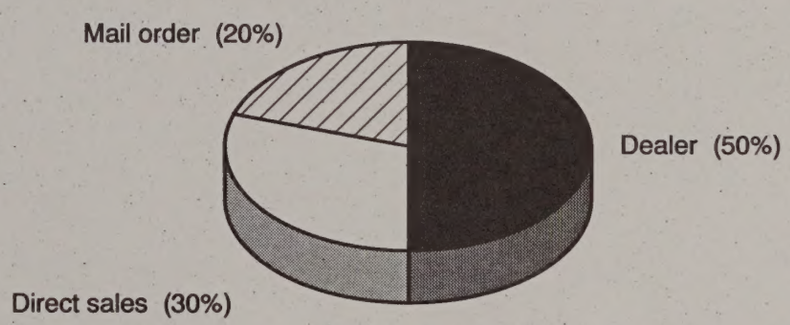
Moreover, C. Itoh TechnoScience (Itoh-chu Tekuno Saiensu), which has had success selling Sun Microsystems workstations, and Uchida Yoko, a major dealer in Japan's educational market, which has been peddling Apple Macintoshes, are beginning to market Compaqs. On the positive side, both of these dealers have experience in selling U.S. computers.

Dell Sales Channels, 1992



Note: Dell started PC sales at stores in 1993.
Source: IDC Japan, 1993

Compaq Sales Channels, 1992



Source: IDC Japan, 1993

Management and Image Flaws

But these three dealer hopefuls will not solve Compaq's Japanese management problems. It is becoming increasingly apparent that old-IBMers like president Murai are not educated in the art of selling personal computers. Furthermore (related to item number three above), quality support at Compaq is still lacking. Top-notch support is an absolutely essential ingredient for success in the Japanese market since users are typically less computer savvy than those in the United States.

Finally, there is the image problem. Japanese personal computer buffs know that Compaqs are the creme de la creme of the PC world. They know that they offer high performance and the highest quality. The problem is that these people are not your average buyer of PCs. To your average Japanese buyer, a Compaq is a no-name brand that offers no discernible benefits.

Compaq does not fare much better with semiknowledgeable buyers that seek out DOS/V personal computers. More often than not, these buyers ultimately buy the only name-brand DOS/V PC they know: IBM. Indeed, IDC believes that Compaq advertising in Japan in many cases benefits IBM more than Compaq since these advertisements simply make buyers more aware of the DOS/V platform. Again, the final result often boils down to DOS/V = IBM.

Can Dell Adapt to the Japanese Market?

Dell Computer's low-profile entry into the Japanese market is shaping up as a more viable strategy than Compaq's costly foray.

Dell has come into the market without spending the enormous promotional and consultation sums that Compaq has while it continues to see a stable rise in unit shipments. Though still behind Compaq in unit shipments, the company is expected to see an uptick in shipments from virtually zero in the second quarter of 1992 to an estimated 22,000 units in 1993 (almost exactly half of what Compaq is estimated to ship in 1993).

Dell has latched on to quality support and is slowly gaining a solid reputation — even at the largest of Japanese computer companies. Some makers are even rumored to be studying the possibility of selling Dell PCs in package deals.

Currently, Dell's marketing structure breaks down to 45% direct sales, 50% reseller, and 5% others. This is markedly different from Compaq — or any major Japanese computer company for that matter — which is focused heavily on dealers.

Though many had their doubts initially about Dell's chances for success in direct sales, Dell is making much more headway here than expected.

Furthermore, in districts like Akihabara, Dell may begin to pick up steam — again unexpectedly. As recently as last year the prognosis for Dell was not good since traditional stores in Akihabara list-price PCs very high, then negotiate discounts with customers. This runs counter to Dell's marketing technique to offer low prices and then stick to them.

But Akihabara and other districts like it are changing in ways that bode well for Dell. New-wave stores like Step and Sofmap, which move thousands of low-priced computers per month, will not negotiate on prices. (Sofmap is now aggressively pushing a line of U.S.-made Dell-like computers under the "Susteen" brand name.) Another plus for Dell: a division of Mitsui Trading now has a large showroom in Akihabara that offers Dell Computers, giving a needed boost to Dell in this all-important retail district.